

From the Library of

Dr. Leonard Field

Gustave L. and Janet W. Levy
Library of Mount Sinai

V.1-3
1934-36



Digitized by the Internet Archive
in 2015

https://archive.org/details/journalofmountsi1319moun

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

VOLUME I · NUMBER 1



MAY - JUNE, 1934

PUBLISHED BIMONTHLY AT MT. ROYAL AND GUILFORD AVES., BALTIMORE, MD.
FOR THE MOUNT SINAI HOSPITAL, NEW YORK CITY
BY ITS COMMITTEE ON MEDICAL EDUCATION AND PUBLICATIONS

Application for the second-class mailing privilege pending at the Post Office at Baltimore, Maryland

Subscription $2.00 per year. Single copies 50 cents.

Made in United States of America

VOLUME 1 NUMBER 1

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

May–June, 1934

FOREWORD

The Mount Sinai Hospital after some deliberation decided to publish a journal devoted principally to case reports.

This decision was prompted by the realization that important leads have often been obtained by a careful observer from significant findings in a single case and many advances in clinical medicine have had their inception in such studies. Thus it was felt that a real need exists for a publication contributing to casuistic medical literature.

A departure from the policy of including only case reports will be made from time to time by the publication of the William Henry Welch, Edward Gamalid Janeway and other lectures, which are delivered annually at The Mount Sinai Hospital by prominent clinicians and outstanding investigators.

This is the plan to which the editorial board of the JOURNAL OF THE MOUNT SINAI HOSPITAL is committed at present. Whether it shall remain as a permanent policy of the JOURNAL will depend upon the views expressed by friends of the hospital and its JOURNAL, whose frank criticism is invited.

The editorial board takes this opportunity to thank the Trustees of The Mount Sinai Hospital for their moral and financial support which made this undertaking possible.

18751

THREE "TUMORS" OF THE PRESACRAL RETROPERITONEAL SPACE

ROBERT T. FRANK, M.D.

The presacral retroperitoneal space, posterior to the broad ligaments, is rarely the site of lesions requiring surgical intervention. Recently I have described a cystic Schwannoma of the sacral plexus in a patient afflicted with Von Recklinghausen's disease (Amer. Jr. Obst. and Gynec., April, 1934, 27: 593).

The following three cases, though of widely differing etiology, had in common the presence of masses in the presacral area. They present interesting diagnostic problems.

CASE 1

H. N. 342,716, admitted August 26, 1932, 35 year old Porto Rican woman. Never pregnant. Admitted with complaint of left lower abdominal pain of four months duration, preceded by one year of weakness, anorexia, occasional vomiting and forty pounds loss in weight.

To the left of the uterus an indefinite, cystic, adnexal mass was felt (fig. 1A); to the right a much larger semi-cystic mass. At operation a large tubo-ovarian cyst was removed from the right side. The left, thickened, chronically inflamed and closed tube was likewise removed. It was noted that along the left lateral wall of the pelvis, a cystic swelling, about the size of one-half of a grapefruit, and entirely retroperitoneal in situation, was located. This extended upward to the anterior-superior iliac spine. Over this coursed the iliac vessels. This retroperitoneal mass was not disturbed.

The patient was re-admitted after six months had elapsed. It was ascertained that after her discharge from the hospital she was confined to bed with lower quadrant pain but with increasing backache and right lumbar pain radiating down to the inguinal region and the anterior aspect of the thigh. The weakness, anorexia, and excessive fatigue had grown more marked.

Examination now revealed an emaciated woman, chronically bedridden, with every evidence of tuberculous spondylitis of the lumbar spine and bilateral psoas abscesses. The right thigh was in extreme flexion, although motion at the hip joint remained free. X-ray of the spine showed irregularity and erosion of the bodies of the third and fourth lumbar vertebrae, the intervertebral disc between the third and the fourth being likewise absorbed. There was likewise an angular deformity.

The findings obtained at the second admission (fig. 1B and C) established

the diagnosis of the retroperitoneal mass seen at the first operation. In the interval a second right psoas abscess had developed and had extended retroperitoneally to the lateral wall of the pelvis.

This is the first time in my experience that such a psoas abscess was noted in its early stage. It was fortunate that the operator (I. K.) refrained from disturbing this abscess as this would have produced an intractable fistula even if tuberculous peritonitis had not developed. The

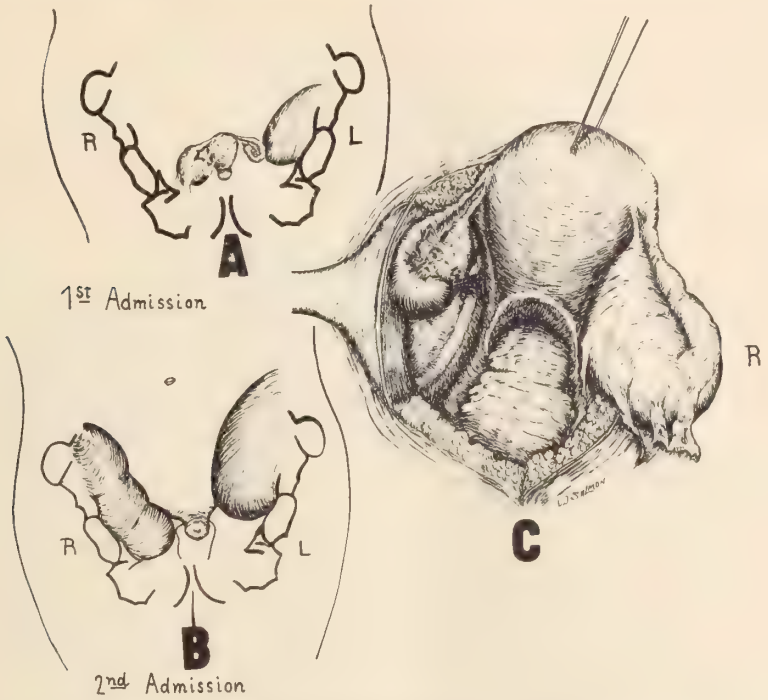


FIG. 1. Case I. A. Drawing illustrating status on first admission with retroperitoneal left cystic mass left.

B. Drawing illustrating pelvic status on second admission with bilateral cystic masses, two psoas abscesses.

C. Status found at operation, showing the bilateral diseased adnexa and behind the left clubbed tubes, a cystic mass with the external iliac artery on its surface.

patient was referred to an institution for chronic diseases where her Pott's disease may be treated by appropriate orthopedic measures.

CASE II

H. N. 346,940, admitted December 19, 1932, 28 year old white woman. Married 6 years. No gravidities. The menstrual history was normal. One and one-half years ago the patient noted a swelling in the left femoral region which was indurated, tender and inflamed. This was diagnosed

by her physician as "glands." The patient remained moderately ill and feverish for three months. Since then there have been intermittent flare-ups of a similar nature, with intervening periods of well-being. During the last three months the patient has complained of more fever and had three shaking chills at irregular intervals. Shortly before admission there was a swelling of the left thigh and a painful cord-like structure running down the inner aspect of the thigh, with edema of the left leg noted.

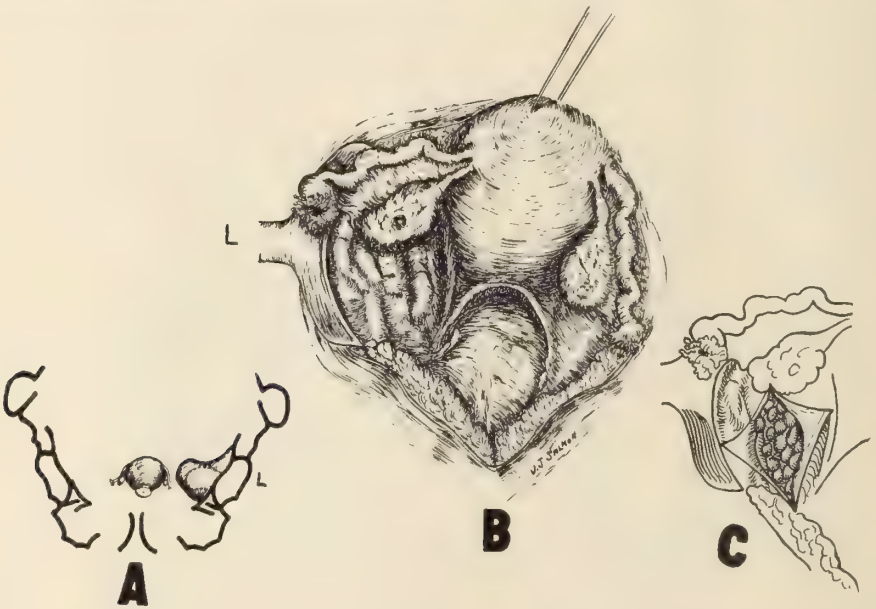


FIG. 2. Case II. A. Drawing illustrating status pre-operatively, showing spur projecting from left pelvic bones. The dotted lines shows slight shrinkage of this mass noted just before discharge.

B. Drawing illustrating condition when abdomen was opened. Cephaled to left ovary, an indurated nodular area is seen.

C. Drawing showing composition of the nodular area, an aggregation of enlarged lymph nodes, plainly visible after posterior abdominal peritoneum had been split and reflected.

The patient was admitted on the medical service where tentative diagnoses of malignant thrombosis of the left external iliac veins, osteosarcoma of the left pelvic bone, as well as carcinoma of the ovary were entertained.

On admission the temperature was 100°, sedimentation time 37 minutes, white blood count 10,000, polynuclear leuocyctes 75 per cent. The Wassermann reaction was positive; the pupils irregular; the left thigh was larger than the right; there was an induration in the region of Scarpa's triangle. The inguinal glands of both sides were enlarged, discrete,

moderately soft, and not tender. The left femoral glands were likewise enlarged.

Pelvic examination disclosed a hard, spur shaped mass projecting from and attached to the left pelvic wall, entirely separable from the uterus, firm in consistence, and slightly movable on the underlying bone. The retrocessed uterus was of normal size. Both adnexae could be felt, essentially unchanged, the left separable from the mass and without connection to it (fig. 2A).

Under observation the edema of the left leg subsided. Irregular elevations of temperature to 100° continued. No changes in the pelvic mass or size of the inguinal glands were noted. The sedimentation time, however, rose to two hours. X-ray of the pelvic bones disclosed no abnormality.

After continued observation an exploratory laporatory was decided upon. The pelvic mass was found to consist of unusually large congeries of iliac lymph glands along the course of the external iliac vessels (fig. 2B and C). Although packed together individual glands could be palpated. It was deemed inadvisable to remove them. After closure of the abdomen an inguinal lymph node on the same side was removed. Pathological examination of the gland disclosed merely a non-specific inflammatory hyperplasia with reticular cell proliferation. The convalescence was uneventful. The pelvic mass has remained unchanged, in spite of thermotherapy.

This case has been interpreted as an unusual massive iliac adenitis, secondary to an inflammatory focus of the left lower extremity, which produced saphenous phlebitis.

The Frei test both before and after operation was found negative.

CASE III

H. N. 344,425, admitted June 7, 1932, 35 year old white woman, gravid 20 times, para II, who had 18 spontaneous abortions, all occurring within the first trimestre. At her first admission the chief complaints were pain in the left lower abdominal quadrant and left lumbar region, occurring at irregular intervals over a period of several years. Recently right lower quadrant pain was likewise complained of.

The general examination was essentially negative. On pelvic examination an indefinite, globular mass of peculiar consistency could be felt deeply posterior on the left side (fig. 3A). On the right side an indefinite, globular mass was noted in the adnexal region.

The mass on the left impressed me as the lower pole of a pelvic kidney of which I have encountered four previously in the course of many years. To confirm this diagnosis, investigation of the urinary tract was undertaken and showed that neither ureter allowed the passage of a catheter beyond 2 cm. Intravenous pyelography disclosed the left kidney in front

of the left sacro-iliac synchondrosis. The ureter on that side was only 2.5 cm. in length.

Because of these findings, especially as the main complaints were referred to the left side, operation was refused and the patient discharged.

The patient was readmitted after five months, at the urgent request of her physician because of the severity of the pain. The right sided mass was still indefinite but of considerable size. At operation a bilateral chronic salpingitis was found with a very large adherent, polycystic ovary

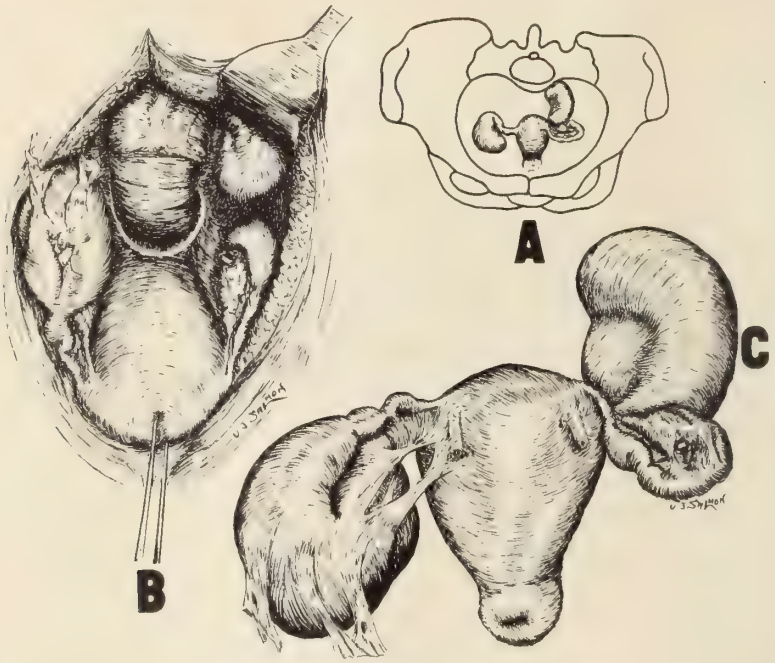


FIG. 3. Case III. A. Drawing illustrating pelvic status on examination with resistance behind left tube.

B. Drawing illustrating condition as found at operation.

C. Drawing of specimen as removed at operation with the exception of the kidney which was left undisturbed but is shown in the drawing in order to emphasize its intimate relation to the tube.

(fig. 3B). The left tube was adherent to the rectum and lateral pelvic wall. The sacral kidney was slightly to the left of the midline, normal in contour and consistency. Its lower pole reached to the level of the second sacral vertebra. A right salpingo-oophorectomy and left salpingectomy were performed (fig. 3C). The post operative course was uneventful. The patient has experienced considerable relief from her disabilities.

The palpatory findings in the presence of pelvic kidney are sufficiently characteristic to permit of a tentative diagnosis of this condition which, of course, must be confirmed by visualization of the urinary tract. Per se,

the pelvic kidney rarely requires operative intervention unless infected. Many years ago an instance came under my observation in which, when the abdomen was opened, a mass was found in the sacral hollow. The exploration, carried out without precise knowledge of the origin of this mass, resulted in serious damage to the kidney vessels, necessitating nephrectomy.

These three cases, together with the Schwannoma published elsewhere, form an extremely interesting and unusual group. Accurate pre-operative diagnosis was impossible in any of them.

CATARACT FOLLOWING THYROIDECTOMY TETANY[1]

KAUFMAN SCHLIVEK, M.D.

Parathroprival cataracts following thyroidectomy have been described as early as 1888. Prior to that Logetschnikow reported bilateral cataracts in a series of fifteen patients with convulsive seizures. He realized, however, that the cataracts were not due to the convulsions but to some other underlying factor. In 1916 Erdheim observed the development of cataract in a parathyroctomized rat. Later Hiroishi noted in the lenses of parathyroidectomized rats opacities as early as the sixth postoperative day. Lens changes were the most constant evidence of parathyroid deficiency encountered and occurred in every case in which complete extirpation of the gland was carried out.

The relationship between thyroidectomy and tetany and the development of cataract in man is illustrated by the following case.

HISTORY

H. N. 324,792. The patient, a woman aged 41, whose family and past personal history is irrelevant, was admitted on April 9, 1931 to the medical service of Dr. B. S. Oppenheimer complaining of cramps and pain in the muscles of the extremities, and impaired vision.

In 1921 she developed the clinical picture of Graves' disease. She was treated medically and received X-ray therapy without definite beneficial results. In December 1928, thyroidectomy was done. Following the operation there was marked alleviation of symptoms. She gained weight and was free of all of the clinical signs, except the exophthalmos. About 16 days after the operation the patient was seized with violent pains in the left arm and shoulder which lasted one day. Three weeks later there was momentary recurrence of cramps in the extremities. The latter tended to flex, the fingers assumed claw-like position, and the palms rotated inward. Since then, until admission to the hospital similar brief attacks recurred without known provocation about twice a month. Once the muscles of the face twitched. On several occasions the patient emitted involuntary sharp crowing noises. These phenomena were attributed by the surgeon to parathyroid injury. Parathyroid injections and the administration of calcium were of doubtful benefit. In June 1930, 18 months after the thyroidectomy, she began to complain of dimness of vision. An ophthalmologist discovered cataract in both eyes, more advanced in the left. The vision continued to decrease.

[1] Presented before the clinical conference of Mount Sinai Hospital, April 29, 1933.

EXAMINATION

Patient is fairly well built and well nourished, not acutely ill. Hair of scalp is abundant, strong and of fine texture. Finger nails are thin. Eyes show marked exophthalmos, O.D. 28 mm., O.S. 29 mm. Von Graefe and Moebius signs positive. In both eyes the lenses show diffuse clouding, more marked on the left. Vision O.D.—3/200, O.S. light perception with good light projection. Blood pressure 152 systolic/94 diastolic. There is an operative scar on the neck and telangiectasis due to X-ray therapy.

Neurological status:—reflexes active and equal. There is an active bilateral Chvostek sign involving the entire distribution of both facial nerves. No Trousseau. Blood calcium on admission was 5.3 mgm. per 100 cc. Electrical reactions revealed a moderate tetanic reaction, CCC > ACC—ACC > > AOC. Under large doses of calcium, viosterol, parathormone and a high calcium diet, the blood calcium rose to 8.5 mgm. per 100 cc. The patient ceased to have pains in her extremities and was much improved although bilateral Chvostek still persisted. She was then transferred to the ophthalmologic service for cataract extraction. The operation was usual except that great care had to be exercised on account of the enormous exophthalmos. The lids were kept sutured for one week. Result excellent. Vision 20/20 and Jaeger ⅌ 1.

COMMENT

Since the pioneer work of MacCallum and Voegtlin it has been repeatedly demonstrated that parathyroidectomy results in hypocalcemia and that, in the great majority of cases, the development of tetany appears to be related to this condition in the serum calcium. The lowered serum calcium indicates a proportional diminution of the calcium in the aqueous humour. Though such reduction of calcium in the aqueous humour is extremely small, the resulting electrochemical changes and disturbances of equilibrium caused by this loss of calcium may nevertheless be great. Calcium has a tendency to diminish the permeability of animal membrane and undoubtedly has much to do with the passage of fluid through the semipermeable lens capsule. It causes changes in the lens protein, hydrolysis with some evidence of hydration in the form of globules, vacuoles and cloudy swelling of the lens fibers believed to be the result of a change in hydrogen ion concentration. A slight decrease in permeability of the lens capsule, experimentally produced, results in cataract in vitro. The permeability of the lens capsule is qualitatively the same in vivo as in vitro. Several other causes have been mentioned but all of them have been refuted.

Cataracts after thyroidectomy generally occur within two years. In many cases it occurs much later. In tetany one frequently encounters trophic disturbances in the hair, teeth, nails, lens and metabolic changes.

In childhood defects in the dentine enamel are more common. The hair and nails are usually involved in adults. Of the trophic disturbances that are of interest here is the development of cataract. In chronic form of tetany it often occurs without changes in the hair and nails. Cataract is more frequent in tetany of adults than of children and appears in a severer form after thyroid operation with injury to or removal of the parathyroid. Postthyroidectomy cataract is much more common in females, most probably due to the higher incidence of goiter and hence greater frequency of thyroidectomy in women, and partly to the higher susceptibility of the sex to tetany because of some metabolic alterations incident to menstruation, pregnancy and lactation. Not all tetany cataracts go on to complete opacity but in most cases the cataracts continue to advance even if the tetany is well under control.

Kast of Zurich has made a special study of the morphology of cataract by means of the slit lamp, and believes that this form of cataract may be distinguished from other forms of lentricular disturbances.

The better understanding of the nature of tetany, its prevention and cure had led to great reduction in the number of tetany cataracts. With sufficient care in operation on the thyroid gland extensive damage to the parathyroid may often be avoided. Thus, Lahey in a review of 6,700 goiter operations found that parathyroid tetany occurred in only three cases. This he attributes to the fact that at the time of the removal, all thyroid tissue was carefully examined for parathyroid bodies. If these were found and the findings confirmed microscopically they were at once grafted into the belly of the sternomastoid muscle. That these grafts take has been proven experimentally.

All thyroidectomy cases should be watched and if they show the first premonitary symptoms such as circumoral constriction or difficulty with speech or moving the lips, before the Chvostek sign is obtained and before the occurrence of spasms, calcium and parathormone should be given as a prophylactic measure. However, it seems to be unwise in parathyroid tetany, before cataracts have developed, to give an increased calcium diet without parathormone. A rapid increase in lens opacity may follow an increased calcium diet when given without parathormone as in one of Cole's cases.

For the cataracts the usual operation is done. Before operation all cases should be treated medically to raise the calcium.

REFERENCE

O'Brien, S. C.: Cataract of postoperative tetany. Archives of Ophthalmology, vol. 7, page 71, January 1932.

A CASE OF PSEUDO- OR TRANSIENT ARTERIOSCLEROSIS[1]

ELI MOSCHCOWITZ, M.D.

[*Service of B. S. Oppenheimer*]

The development of thickened radial vessels and hypertension in the course of acute glomerulo-nephritis is, of course, not uncommon. Less common are such instances in which the tension returns to normal and the hardening of vessels disappears, as in the case herein reported.

HISTORY

H. N. 343,571. A boy,. 15 years of age, was admitted to the Hospital September 17, 1932. Two weeks before admission he had headache and vomited a number of times. A week later he had an attack of nocturnal dyspnoea, which recurred for a few successive nights. Headache and vomiting reappeared. The urine was red.

EXAMINATION

On admission he presented signs of pulmonary edema with dyspnoea. The blood pressure was 134/104. The urine contained abundant albumen, red blood cells and casts. The hemoglobin was 78 per cent; the red blood count was 3,870,000. The blood urea nitrogen was 44 mgm. per 100 cc.

COURSE

The boy manifestly had an acute glomerulo-nephritis. Its cause was somewhat obscure. A sore throat, which the patient had about a month previously was in all probability the cause. At the time of admission the radial vessels were hard, were compressed with difficulty and could be easily rolled beneath the palpating finger. For this reason the diagnosis of a chronic nephritis upon which this acute attack was superimposed was seriously considered, but this was hardly tenable in view of the fact that he had been well observed in the Hebrew Orphan Asylum by Dr. William Friedman, who assured us that the boy had no previous nephritis. Within four days after admission the blood pressure had sunk to 106/64. The case was then recognized as a possible *pseudo or transient arteriosclerosis* and, in view of the fall in blood pressure, the prediction was ventured that the sclerotic feel of the radial vessels would disappear. The patient's blood pressure remained normal; the albumen slowly diminished in the urine; the azotemia disappeared; the concentration of the urine which even at the first observation never rose above a specific gravity of 1,012

[1] Presented before the Clinical Conference of Mt. Sinai Hospital, Feb. 24, 1933.

became normal. The first electrocardiogram showed evidence of myocardial insufficiency as evidenced by a cove plane T Wave in Leads I and II; later electrocardiograms were normal. Coincident with the improvement shown by the laboratory findings the patient manifested also clinical evidence of recovery. Most striking was the slow disappearance of the sclerotic feel of the radial vessels so that upon his discharge five weeks after admission the vessels were normal for a boy of his years. Two years later the boy was found to be perfectly normal in every respect.

COMMENT

The clinical picture as presented by this patient has been observed by me (1) several times.

In one case that came to autopsy the aorta showed no sclerosis whatever. The feel of the thickened vessel in my opinion was the result of two factors: (1) The increased intravascular tension and (2) an hypertrophy of the muscular coat of the vessel consequent to the increased intravascular pressure, a mechanism comparable to that which operates in left ventricular hypertrophy associated with hypertension. This belief is based upon the observation that the normal feel of the vessel is not restored until three to eight weeks after the tension becomes normal. The recognition of this syndrome is of course, important for purposes of prognosis.

REFERENCE

Moschcowitz, Eli: Pseudo- or transient arteriosclerosis. Journal American Medical Association, XC, 1928, 1526.

DISSECTING EPIDURAL ABSCESS IN AN INFANT SIX MONTHS OLD[1]

LOUISA W. RAUH

[*Service of Dr. Bela Schick*]

A normal 6 months old infant became ill with high fever, restlessness, twitchings of the muscles of the arms and stiff neck. Xanthrochromic spinal fluid was found on lumbar tap. Subsequently the child developed a flaccid paralysis of both upper extremities and later a spastic paralysis of both lower extremities. At the same time an abscess in the right lumbar region was noted. Puncture of the epidural space in the lumbar region yielded thick pus. The abscess was incised and drained and a laminectomy of the 2nd and 3rd lumbar vertebrae was performed. Thick pus was encountered in the epidural space flowing down from the thoracic spine and drainage was instituted. The patient made a complete recovery.

HISTORY

H. N. 348583. A 6 months old white male infant was admitted to the Pediatric service on Feb. 1, 1933. He was a full term baby born normally. There was no cyanosis or bleeding immediately after birth and no convulsions. He was breast fed. His development had been normal. There was no history of trauma or fall.

Up to six days before admission he was in perfect health and the first symptom noticed was restlessness. His temperature rose to 103 and he refused his feedings. The fever persisted with daily variations from 99 to 103. The periods of restlessness were followed by severe prostration. On the day of admission there appeared slight rigidity of the neck.

EXAMINATION

The infant was a well developed and well nourished boy weighing 19 pounds. He whimpered continually and was very restless and irritable. There were occasional twitchings of the left arm, hand and lower jaw. The temperature was 101°. The anterior fontanelle was wide open and flat. The neck was somewhat rigid. The pupils were equal, regular and reacted to light. Examination of the ears was negative. The pharynx was diffusely red. Heart, lungs and abdomen were negative. There was no facial paralysis and no paralysis of the extremities; the deep reflexes were equal and active. The abdominal reflexes were not obtained; the

[1] Presented before the clinical conference of Mt. Sinai Hospital, Jan. 26, 1934.

cremasterics were present. There was a suggestion of a positive Brudsinski; the Kernig sign was absent. The fundi were found to be normal.

COURSE

The Schick, Pirquet and Mantoux Tests were done and found to be negative. The blood count showed a slight secondary anemia. The urine was negative. The blood calcium was 11 mgm. per cent and the phosphorous 5 mgm. per cent.

A lumbar tap was done on admission. The fluid was found to be xanthrochromic. The rate of flow was slow. There were 150 cells, 70 per cent polymorphonuclears, 30 per cent Lymphocytes, 2+ Globulin and Sugar 0. On smear and culture no organism was found. The fluid clotted rapidly on standing.

A tentative diagnosis of chronic pachymeningitis hemorrhagica was made. Neveretheless it was thought best not to do a fontanelle puncture but to observe the patient for a time. An absolute diagnosis of chronic subdural hematoma can only be made if a straw colored or bloody fluid is found on fontanelle puncture. Three days after admission another lumbar puncture was done and again the fluid was Xanthrochromic. The flow was extremely slow and only 1 cc. of fluid was obtained. The fluid clotted almost immediately. There were 160 cells, 70 per cent polymorphonuclears and 30 per cent lymphocytes, 2+ Globulin and sugar 0.

Up to 9 days after admission the infant's condition remained unchanged. The temperature ranged from 99 to 102½. The twitchings of the left hand and arm seen on admission were not seen again after the first 24 hours. However, 9 days after admission a flaccid paralysis of both upper extremities was first noticed. The baby moved only his fingers and shoulder girdle very slightly when stimulated by pin prick.

There was no apparent sensory disturbance but this was difficult to determine in a 6 months old infant. There was some pain on movement of the neck. This time it was realized that the Xanthrochromic spinal fluid, its massive coagulation and the increased globulin were typical of a Froin's syndrome, due to compression of the cord by some expanding lesion, inflammatory or neoplastic. Because of the flaccidity of the upper extremities and the neck rigidity, it was felt that the lesion was probably in the cervical region but the character of the lesion was still obscure.

Ten days after admission a beginning but progressively increasing spasticity of both lower extremities was noted and the infant was disinclined to move either extremities spontaneously. The same day a swelling in the right lumbar region opposite the first and second lumbar vertebrae was first noted. It was somewhat fluctuant but showed no redness, increased heat or tenderness. An X-ray examination of the cervical spine was made and was found to be negative.

The findings up to this time were: spinal fluid typical of Froin's syn-

drome, a rigid neck, flaccid paralysis of both arms, increased deep reflexes in both legs with beginning spasticity, and a fluctuant mass in the right lumbar region. On the 13th day after admission a ventricular puncture through the fontanelle was attempted but was unsuccessful. A cistern puncture yielded clear fluid. Simultaneously a lumbar puncture was attempted with the needle inserted in the neighborhood of the 3rd lumbar space. Thick pus was obtained and when pressure was applied to the mass in the lumbar region at the time of the puncture there seemed to be an increase in the flow of the pus. On culture of this fluid a strep. hemolyticus was found. It was thought at this time that the child had an

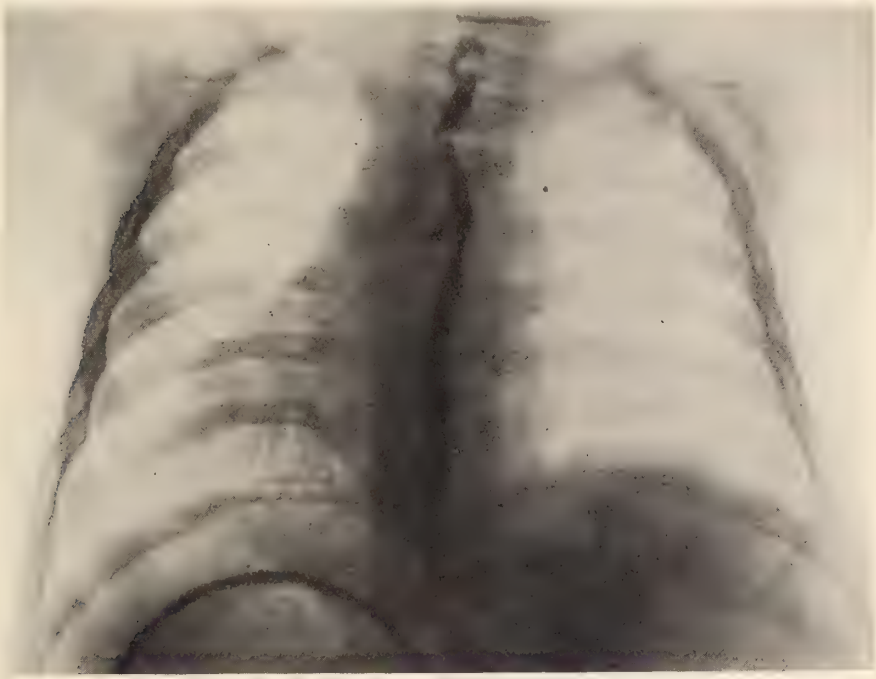


FIG. 1. X-rays of spine showing iodized oil injected through lumbar drainage tube

osteomyelitis of the cervical vertebra with a dissecting epidural abscess extending to the lumbar region which had broken through into the surrounding soft tissue.

Operative interference was decided upon and Dr. Ira Cohen incised the mass in the lumbar region continuing the incision over the lumbar spine from the first to the fourth lumbar vertebra. Thick pus was encountered in the masculature with a tract leading directly to a piece of eroded bone at about the level of the 1st lumbar vertebra. Pus was seen coming from within the spinal canal at this point. After removing part of the spines and laminae of the 2nd and 3rd lumbar vertebra pus was seen flowing

along the extradural space. A rubber tube was inserted up to about the level of the 3rd thoracic vertebra.

The operation was followed by rapid improvement. Six hours later the child began to move his fingers. The next day he was able to move his wrists and the spasticity of the legs became less marked. The temperature dropped to normal 2 days after the operation and remained normal except for a slight elevation over a period of a few days during which time he suffered from a mild upper respiratory attack. The child was discharged 8 weeks after admission at which time there was no evidence of any paralysis. He moved all four extremities and the reflexes were normal. He was seen at the Pediatric Follow-up Clinic December 7, 1933, 8 months after his discharge, and at that time he was walking, was beginning to talk and his general condition was excellent.

COMMENT (*Dr. Ira Cohen*)

The paralysis of the arms pointed to a lesion in the cervical region. While never proven, the most probable source of the pus was osteomyelitis of a cervical vertebra. In infections of the epidural space the pus makes its way on the posterior surface because of the more intimate attachment of the dura anteriorly to the bodies of the vertebra. Epidural spinal abscesses most frequently cause a flaccid paralysis with the picture of a complete transverse lesion. From this complete or even partial recovery is rare. The lumbar swelling and the rapid evolution of the picture should have suggested the inflammatory nature of the process. The escape of pus into the soft parts not only prevented further increase of pressure on the cord but indicated to the surgeon nature's channel of drainage. Hence lumbar drainage proved adequate in caring for a lesion originating in the cervical region. In the post operative course iodized oil was injected through the drainage tube and X-rays taken. This was done in an effort to demonstrate the exact source of the infection. It failed of its purpose but showed that the drainage track led to the cervical region (fig. 1).

TRANSITIONAL CELL CARCINOMA OF THE THYMUS IN A CHILD[1]

ARTHUR S. W. TOUROFF, M.D.

[*Service of Dr. Harold Neuhof*]

HISTORY

H. N. 358,959. The patient, a white female aged 9, was admitted to the hospital on November 2, 1933. Nine weeks before admission, the mother noted that the left side of the child's chest appeared to be diffusely enlarged. About four weeks before admission the child had an upper respiratory infection with cough and temperature of 102°. The physician who saw her at that time made a diagnosis of fluid in the left chest and referred her to another hospital. While under observation the left chest was aspirated posteriorly, on three occasions. Twice a small amount of bloody fluid was obtained, while the third time a small amount of brownish thin fluid was aspirated. No definite diagnosis was arrived at, and the patient left the hospital against advice. During the nine weeks of illness the child had lost about five pounds in weight and had recurrent episodes of mild fever, unproductive cough and malaise. There had been no dyspnea or pain in the chest. The past history was not remarkable except for the following:—shortly after birth the child developed paroxysmal cough with dyspnea and cyanosis which recurred periodically. X-ray examination at that time was said to have disclosed an enlarged thymus gland. Accordingly, radiotherapy was administered with complete relief of symptoms and disappearance of X-ray shadow after about two weeks.

On admission the essential physical findings were as follows: Good general nutrition. Enlargement of the left hemithorax with widening of the intercostal spaces. Flatness on percussion, distant to absent voice and breath sounds, and absent fremitus over the entire left chest. Marked displacement of the heart and mediastinum to the right. Liver palpable two fingers' breadth below the costal margin. Temperature 100°. Pulse 120. Hemoglobin 84 per cent; white blood cells 10,200; polymorphonuclears 70 per cent; lymphocytes 22 per cent; monocytes 8 per cent. Urine negative. Von Pirquet, Mantoux and Dick tests negative. X-ray examination (fig. 1) revealed the presence of a dense shadow occupying the entire left hemithorax from base to apex and displacing the heart and mediastinum well into the right chest. The mediastinum was considerably wider than normal. The intercostal spaces were markedly widened.

[1] Presented before the clinical conference of Mount Sinai Hospital, Nov. 24, 1933.

A number of irregular areas of absorption were present in the second rib posteriorly on the left side.

Under the assumption that the shadow in the chest was due largely to a pleural effusion, aspiration was performed posteriorly in the eighth

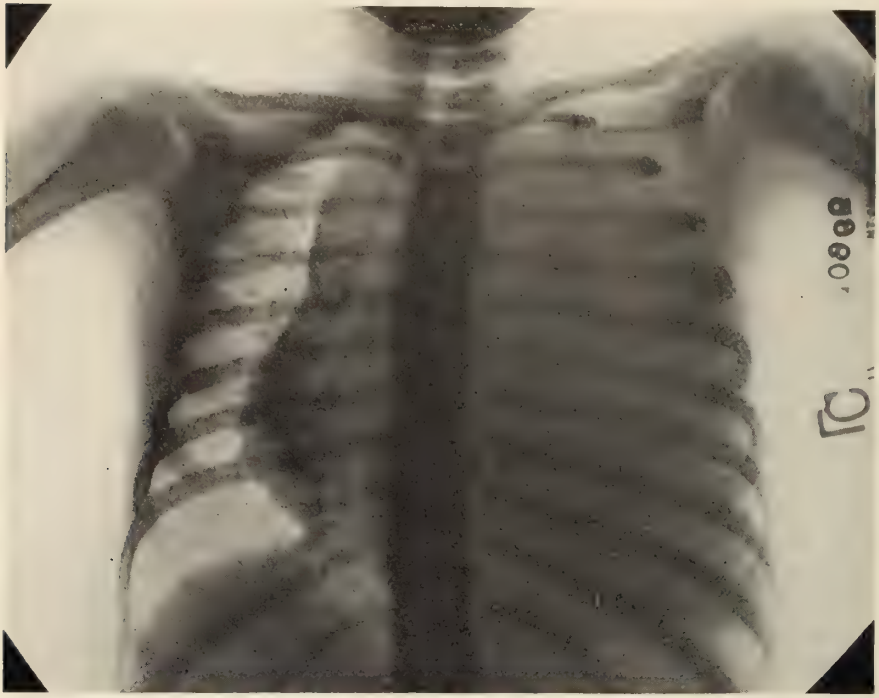


Fig. 1. Massive neoplasm and effusion occupying the left hemithorax. Note widening of intercostal spaces and marked displacement of heart and trachea to the right. Note widening of mediastinum above the cardiac shadow.

interspace. Only a small amount of bloody fluid, however, was withdrawn. On pathological examination of the fluid several small fragments of tissue were found which were reported as "transitional cell carcinoma most probably of thymic origin." In order to secure more tissue for examination, a second aspiration with a large-bore needle was performed in the second interspace anteriorly close to the sternum. On this occasion only solid fragments of tissue were aspirated—examination of which revealed the same findings as on the previous examination.

During the five-day stay in the hospital, temperature ranged between 98.6° and 100°, and the pulse rate remained for the most part between 110 and 120.

Following her discharge from the Hospital the patient received intensive radiotherapy. She has gained seventeen pounds in weight and feels perfectly well. Recent X-ray films (fig. 2) reveal the mediastinum to be

normal in width and drawn slightly to the left; the left chest clear except for the presence of a small encapsulated pleural effusion in the axillary portion of the upper half, and a few pleuro-pericardial adhesions on the left side.

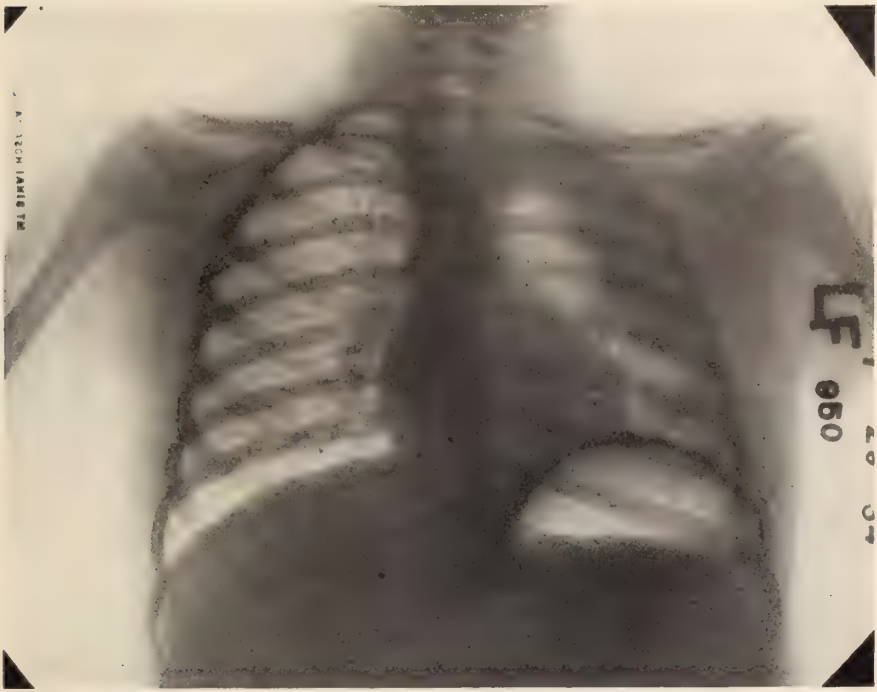


FIG. 2. The same patient 5 weeks later (after the administration of intensive radio-therapy). Note disappearance of shadow in the left hemithorax. Small residual encapsulated axillary effusion still present. Note return of heart and trachea to normal position. Mediastinal widening has practically disappeared.

COMMENT

1. Attention is drawn to the unusual occurrence of transitional carcinoma of the thymus in a patient who, as an infant nine years before, had an enlarged thymus which disappeared under the influence of radiotherapy.

2. From the appearance of the X-ray films the impression was that the lesion was essentially a collection of fluid. Aspiration, however, proved it to be an extensive neoplasm associated with a relatively small amount of fluid.

3. Of great interest is the unusual sensitivity of a massive tumor to radiotherapy as is usually the case with most tumors of thymic origin.

4. Recovery of tumor cells from pleural fluid is indicative of extensive pleural invasion.

FRONTAL SINUSITIS—"COLLAPSE" OPERATION

LOUIS KLEINFELD, M.D.

[*Service of Dr. R. Kramer*]

A case of chronic frontal sinusitis which did not respond to persistent intra-nasal therapy or to a Killian type operation.

Signs of impending intra-cranial complications demanded the radical Riedel "Collapse" operation.

HISTORY

H. N. 350,686. A 55 year old white male, who for the past year had been suffering from a left frontal headache associated at times with swelling of the left upper lid, lasting from three to four days, entered the hospital December 11, 1932. He had had frequent nasal treatments at home during this period.

Six days prior to his admission there had been a recurrence of the swelling, with very marked pain, associated with a decrease in the discharge from the left nostril. The temperature ranged from 100 to 101.

EXAMINATION

There was a rather firm, tender swelling over the anterior wall and floor of the left frontal sinus. There was intra-nasal evidence of a marked bilateral suppurative pan-sinusitis. The pre-operative diagnosis was perforating frontal sinusitis. The possibility of an infected sarcoma was also considered.

The white blood cell count was polymorphonuclear leucocytes 71 per cent. X-ray examination of the skull showed pan-sinusitis and hazy roof of the left orbital rim.

COURSE

On December 11, 1932 under Avertin anaesthesia a modified Killian operation was done. Beneath a markedly thickened periosteum free pus was found coming from a perforation in the floor of the frontal sinus as well as from a perforation in the orbital plate of the anterior ethmoidal cells. The frontal sinus was found to be full of pus. The mucosa was much thickened. The posterior frontal wall, in contact with the dura, was intact. The upper part of the anterior wall was removed, leaving in place a thin bridge of bone, in order to minimize the deformity. The floor was removed in toto, and the naso-frontal duct enlarged. The operation was completed by an intra-nasal anterior ethmoidectomy.

Drainage was instituted by a rubber tube passed from the frontal sinus into the nose. This tube was sutured in place. Culture of the pus showed staphylococcus albus. Microscopic examination of the mucosa showed acute and chronic inflammation.

The post operative course was uneventful, except for occasional headache, associated with a pulse rate of sixty-four. The neurological examination was, on the whole, negative, although at one time the veins of the right fundus were thought to be dilated and a right Babinski was detected on one occasion.

On December 27, 1932 (two weeks after the first operation) a submucous resection was done, preliminary to the intra-nasal operation on the sinuses. The submucous was performed in the usual manner but the nose was not packed post-operatively.

January 1, 1933 (one week later) a right intra-nasal sphenoidectomy and antrotomy were done. Pus and polypoid tissue were found throughout the cells and an osteoma was present in the anterior ethmoid region.

Following this operation, the patient's temperature rose to 104 for two days and then gradually subsided. No definite reason for the pyrexia could be found. The blood culture was negative.

January 20, 1933 (two weeks later) the left sphenoid, ethmoid, and antrum were revised.

The patient was kept in the hospital a week longer.

On February 8, 1933 (two weeks later) the patient was readmitted with a swelling over the left eye. This yielded to local treatment. At this time, the intra-nasal antral openings were enlarged.

Three months after the original operation, there was another flare-up, with swelling over the left eye. It was decided to do the Riedel operation, which offered the best chance of permanent cure. This operation, commonly called the "Collapse" operation, is the most radical of all operations on the frontal sinus. The mucous membrane is completely removed, after which the skin is pushed back against the posterior wall of the frontal sinus, thus completely obliterating its cavity. This naturally results in a marked depression over the eye. However, the prognosis for complete cure is far better than in any other type of operation. It was thought in view of the man's age that the usual deformity following the operation was not a contraindication to the operation.

March 4, 1933. Under Avertin anaesthesia, the left frontal area was exposed. The bony bridge, which had been left at the first operation for cosmetic reasons, was found to be partly necrotic, and was removed. All the mucous membrane was curetted away.

March 20, 1933. One week later, there was a brief convulsive seizure of the left face and arm (two minutes), associated with unconsciousness for the same period. There was no further interruption to recovery and the patient was discharged on May 9, 1933.

The patient has been observed for the past nine months. There have been no symptoms either local or neurological, in spite of an acute rhinitis. The postoperative hollow over the left eye has diminished.

COMMENT

The patient's lesion was so extensive and chronic that local therapy, intra-nasal procedures and the Killiam operation were ineffectual. As a last resort, especially in view of a threatened intra-cranial extension, a radical operation was done, in spite of the inevitable deformity. (If the patient, however, were young enough to justify it, this deformity could be erased by a comparatively simple plastic operation at some future date.)

The patient has been free of neurological symptoms for the last nine months, but the previous occurrence of such manifestations demands that the patient be kept under observation.

MENINGOCOCCUS ARTHRITIS AND MENINGITIS[1]

HARRY L. JAFFE, M.D.

[*Service of Dr. B. S. Oppenheimer*]

The following case is of interest not only because of its atypical course but also because of the opportunity it afforded of observing morphologically the rapidity with which processes of repair occur.

HISTORY

H. N. 359,088. The patient was a white man of 65. At the age of 35 he suffered an attack of arthritis which left no sequelae. During the last ten years he was found to have hypertension and he complained of dyspnea on exertion. Frequent colds and sore throats occurred. It was for these indefinite complaints that he was induced by his family to consult a physician; the Wassermann was found to be positive. He was therefore given antiluetic therapy, intravenously and intramuscularly, approximately 30 injections by each route. He received the last injection intravenously 2 weeks before admission. Several days prior to this he had had a chill and continued to have moderate fever. One week after the chill the right wrist became swollen, painful, and red; the following day the right ankle presented a similar appearance; this did not change during the following week. The patient continued to grow more ill. Before coming to the hospital his skin became yellow. The urine had been dark red for several days.

EXAMINATION

He was found to be moderately jaundiced; he rigidly guarded the right wrist and ankle against all motion; the general attitude was one of apathy but he responded promptly to questioning. The pupils were equal and round; they reacted promptly to light and in accommodation. The sclerae were icteric. There was no evidence of acute sinusitis. The epitrochlear and inguinal nodes were palpable. Over the aortic area there was a systolic murmur, and along the left border of the sternum a short diastolic murmur. The right wrist and ankle were immobile and diffusely swollen, tender and red, the appearance suggesting considerable periarthritis. The anal sphincter was lax; there was no urethral discharge.

COURSE

Although the temperature was only 100°, the leucocytes numbered 28,600, of which 92 per cent were polymorphonuclears. The sedimenta-

[1] Presented before the clinical pathological conference, December 20, 1933.

tion time was 38 minutes. The blood pressure was 174 86. The urine contained a trace of albumin, bile and urobilin.

The diagnosis at this time seemed to be syphilis, syphilitic aortitis with aortic insufficiency, gonorrheal arthritis, and hepatic degeneration, probably arsenical, in confirmation of which were the following laboratory data: Wassermann 4 plus, icteric index 35, bilirubin 2.5 mgm. (indirect), cholesterol 160 mgm., cholesterol ester 65, urea 15 mgm., sugar 135 mgm. Tyrosine was present in the urine. (With the improved methods now employed at the Hospital, the finding of tyrosine in the urine is much more frequent than formerly and not so significant.) X-ray of the chest showed hypertrophy of the left ventricle with diffuse dilatation of the aorta. Aspiration of the wrist joint yielded purulent fluid containing Gram-negative intracellular diplococci on smear.

Soon after admission, temperature rose to 103° and neck rigidity appeared; it was followed by other manifestations of meningitis. On lumbar puncture cloudy bile-stained fluid under normal pressure was obtained; it contained 2,100 cells, of which 71 per cent were polymorphonuclears; smear was negative; the Wassermann was 3+. Blood culture was negative. From both the spinal and joint fluid Gram-negative diplococci were cultured, which proved to be meningococci. Serum was therefore administered intraspinally twice daily. The condition of the patient at first seemed desperate and remained so for three days. He developed opisthotonos, and suffered one attack of pulmonary edema. At the end of that period he began to improve. The temperature dropped to 100° and the jaundice receded. Within a week, the jaundice, as well as the arthritis, was no longer present, and only residual evidence of meningitis remained. Icteric index and bilirubin had fallen. He continued to do well for another week; then there was recurrence of arthritis and fever, which again subsided. Three weeks after admission the patient again began to complain of diffuse pains; his pulse rose, the nuchal rigidity recurred and he became stuporous. The spinal fluid was essentially negative. In the course of a few days he lapsed into coma and died 4 weeks after admission. The temperature remained normal until the last day.

ANATOMICAL FINDINGS

At post-mortem the cause of death was found to be confluent bronchopneumonia of the left lower lobe with fibrinous pleuritis. The brain was reported by Dr. Globus to have revealed senile atrophy and severe arteriosclerosis. There was slight injection and marked thickening of the leptomeninges. There was, however, no residual of a recent inflammatory process in the meninges. There was dilatation of the left ventricle, chronic rheumatic mitral valvulitis with doubtful acute changes on the valve. There was syphilitic mesaortitis with saccular dilatation of the arch of the aorta. The liver was smaller than normal, weighing 1,000 grams; microscopically the capsule was thickened; the lobular arrangement

was partly obliterated; the periportal areas contained very large infiltrations, consisting especially of round cells. There was distinct fibrosis of the periportal areas with extension into the neighboring sinuses. Areas of necrosis were scattered throughout the hepatic parenchyma. Many of these foci were infiltrated, others fibrotic. These changes were considered by Dr. Klemperer indicative of the precirrhotic stage following liver degeneration.

COMMENT

Despite the negative blood culture obtained in the hospital, it is most probable that the onset of the illness with chills represented the invasion of the blood by the meningococcus, which became localized first in the joints and later in the meninges, an occurrence considered favorable by some authors (1) for ridding the body of the general infection. Of a series of 17 reported cases, 5 with meningeal localization recovered (2). In view of the complete absence of inflammatory disease in the meninges within a month of the onset of the acute meningitis, it is especially to be regretted that he succumbed to an intercurrent pneumonia contracted after his clinical recovery from the meningitis.

Of the triad of symptoms characteristic of meningococcemia (3), in the present instance two, the eruption and intermittent fever, were absent; at no time were lesions of the skin observed, and the temperature was usually not above 100°. Furthermore, although fleeting arthralgias are a very common finding in chronic meningococcemia, suppuration of a joint is relatively rare. Complete resorption is characteristic.

That the hepatitis was induced by salvarsan is most likely as no report of jaundice in chronic meningococcemia has been found on searching the literature. The disappearance of the jaundice coincident with the administration of the anti-meningococcus serum is to be noted.

It is interesting to correlate the finding of rheumatic disease of the mitral valve with the attack of arthritis suffered by the patient at the age of 55.

SUMMARY

A case is reported of chronic meningococcemia in a man of 65, with localization in the joints and meninges, in which recovery occurred following serum therapy. Death was caused later by an incidental pneumonia. At post-mortem no evidence of the recent meningitis remained. The opportunity presented itself also of studying the regenerative processes in the liver following acute arsenical hepatitis.

REFERENCES

(1) Chalier, J., Giraud, P., and More, M.: J. de Med. de Lyon, 7: 565, 1926.
(2) Riven, S. S., and Applebaum, A.: Ann. Int. Med., 4: 1387, May 1931.
(3) Carnot, P.: Rev. gen. de Chem. et de Therap., 46: 97, February 13, 1932.

MEMOIR

Alexis Victor Moschcowitz

April 25, 1865–December 21, 1933

In the passing of Alexis Victor Moschcowitz, a great loss has been sustained by the community and by the medical profession. Born in Giralt, Hungary, he came to this country at the age of fifteen years and grew up in the American environment, absorbing all that was best and ennobling in it, and became an outstanding figure in his profession. His appreciation of American tradition was crystallized in his devotion to justice and democracy, as exemplified in his ideal statesman, Abraham Lincoln.

In 1885 he was graduated from the New York College of Pharmacy and in 1891 from the College of Physicians and Surgeons, Columbia University, winning one of the Harsen prizes. He served as House Officer at the German Hospital and after graduation he began the practice of medicine, only specializing in surgery after several years apprenticeship under leaders in this branch of medicine. In 1898 he was appointed adjunct in surgery at the Mount Sinai Hospital, and thereafter his star rapidly rose. He became in 1914 Attending Surgeon at this Hospital, and assumed similar duties in several other hospitals.

During the late war he served on the Empyema Commission, and became chief of the surgical services at Camp Anniston and Asheville. He retired with the rank of colonel after serving as one of the Consultants in the Surgeon General's office in Washington, D. C.

At his premature death he was Consulting Surgeon at Mount Sinai Hospital, Israel Zion Hospital, Bronx Maternity and Woman's Hospital. In recognition of his careful work and his gifts as a teacher, he became Professor of Clinical Surgery at his alma mater.

Dr. Moschcowitz was an outstanding personality. His contributions to medicine, well over a hundred, were painstakingly careful products of intense thought and assiduous labor. The accuracy of his work and the honesty with which he presented it rapidly advanced him in the esteem of his fellows and recognition came in membership in the New York Surgical Society and the American Surgical Association, as well as in the American Association for Thoracic Surgery and the International Surgical Association. In these various societies, the members were delighted to hear his presentations, perhaps even more his whimsical, humorous dis-

cussions and apropos remarks. He did much to elucidate the problems of surgery of the appendix, of hernia in its various manifestations, of neoplasia of the breast, of prolapse of the rectum, of osteoplastic amputations, of empyema, and of diseases of the costal cartilages, as well as numerous other diseases and conditions, during a period when surgery in those fields was still in flux.

As a surgeon he was preëminently a physician, as far as his care and solicitude for his patients were concerned. He was painstaking and considerate and no effort was too great for him. In his relations with the House Officers and nurses he was both friend and teacher. His criticism was always constructive and helpful. Ruffled or unruffled by operative difficulties, he always came out of the situation serene and calm, grateful to those who assisted him and to those who might have advised him.

After a life crowded with humane activities, a life full of useful work, in the fullness of his powers he was seized with distressing pain and succumbed to an occlusion of his coronary artery. His passing has left a great void, and his memory will be cherished by all who knew him. To know him well was to love him. To exaggerate his sterling qualities is impossible.

Edwin Beer.

SOME RECENT ADVANCES IN THE PHYSIOLOGY OF THE ANTERIOR PITUITARY[1]

J. B. COLLIP, M.D., F. R. S.

Department of Biochemistry, McGill University, Montreal

The history of pituitary physiology has passed through various stages. The earliest period in the development of our knowledge on the functions of this gland is that of the anatomists. In this era pure morphological observation and theoretical speculation were the only means by which scientists tried to attack these problems, and the results they obtained would certainly seem rather ingenuous today. First Galen (1) thought the function of the gland to be filtration of a mucous fluid produced by the brain and its secretion into the naso-pharynx. Therefore he called the gland "glandula pituitaria." Piccolhomini (2), in 1636, maintained that the function of the pituitary is to close the lower aperture of the infundibulum, and thus to prevent the spirits of life from escaping.

The next period in the history of pituitary physiology was that of clinical observation of hypophyseal diseases initiated by Pierre Marie's classical papers on acromegaly. These observations first called attention to the rôle of this gland in the regulation of somatic growth.

The modern era in the study of this gland began with the introduction of experimental methods. Just as in the study of other endocrine glands, it has been of great value to observe the changes following the removal of the pituitary from the organism. This operation, which was first performed by Sir Victor Horsley in 1886 (3), has proved to be of great assistance in the solution of problems concerning pituitary physiology. The technical difficulties connected with it account for the poor results of earlier workers, which led to erroneous conclusions. Most of their experimental animals died shortly after removal of the gland and therefore they concluded (Vassale and Sacchi (4); Biedl (5) and others) that the hypophysis is absolutely essential for life. Improvements of the surgical method by later investigators such as Cushing, Aschner, Smith and others have now definitely established the fact that an animal may live for very long periods after complete hypophysectomy.

By far the most satisfactory approach is the oral, or parapharyngeal route, which allows the removal of the gland without injury to the adjacent hypothalamic centres of the brain. This method has been used throughout in our laboratory and enabled us to study, during the past two

[1] Delivered at the Mount Sinai Hospital, New York City, on March 26 and 27, 1934.

years, the effects of hypophysectomy on mice, rats, guinea-pigs, cats, dogs and monkeys.[2] We found it very helpful to use ether as an anaesthetic, given through a tracheal cannula, or an intratracheal tube. The danger of meningitis is comparatively slight, even though an open communication is left between the sella turcica and the naso-pharynx, for this communication is closed very soon after operation by a clot.

I should like to give you now a short description of the symptoms of pituitary deficiency which appear after surgical removal of the gland, and also of the effect of replacement therapy.

GROWTH

In accordance with observations of other investigators, we can confirm the observation that removal of the pituitary stops growth, but we found that there is one rather remarkable exception to this rule. If hypophysectomy is performed in very young animals—for instance, in rats about three weeks of age—growth does not stop immediately after operation, even though the gland is completely removed. Thus we have seen that rats which weighed approximately 25 35 grams at the time of operation proceeded to grow until they reached a weight of approximately 60 grams (6). Serial sections proved that no trace of pituitary tissue was left behind. The possibility of growth in the absence of pituitary tissue in very immature animals is of particular interest, because it shows that in early stages of ontogenetic development the organism must have an extra-hypophyseal source of growth-stimulating substances. Here again we see once more the striking parallelism between ontogenetic and phylogenetic development, for it has been shown that the growth in length of reptiles and amphibia is also largely independent of the pituitary and therefore will not be completely inhibited by hypophysectomy.

The most satisfactory test animal for the standardization of hypophyseal growth hormone has proved to be the hypophysectomized rat of about 100 grams in weight. If the pituitary is removed at this period, growth will stop immediately unless growth-hormone-containing extracts are administered.

Physiological effects of the growth hormone

Hypophysectomized rats treated with a purified growth hormone (Q extract) put on weight immediately. This is in marked contrast to the effect which we obtained in our earlier work when crude alkaline extracts of anterior lobe were being used. We observed then that a period of about ten days elapsed before any appreciable growth took place. This we know now was due to the presence of the thyreotropic principle in the extracts used at that time, since simultaneous administration of the purified growth and thyreotropic principles does not result in growth until

[2] Doctor Hans Selye has carried out most of the hypophysectomies.

late in the second week. This apparent inhibitory action of the thyreotropic substance upon the growth substance is due probably to the increased metabolism offsetting the growth effect and is not a direct antagonistic action of the thyreotropic and growth principles. We agree with Evans that adult rats whose growth curves are plateaued may be caused to grow with the growth extract. We have been unable to affect appreciably the growth curve of normal male rats treated daily with the Q extract from the 4th week of life. Female animals so treated

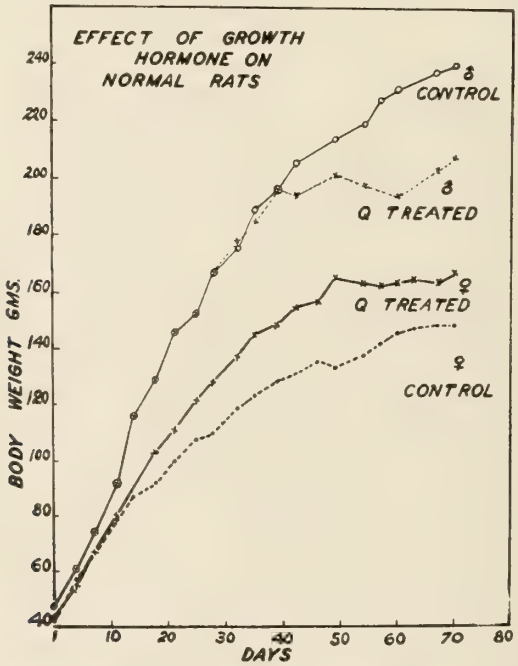


Chart 1. Growth curves of normal rats treated with growth hormone (Q extract) compared with untreated controls, male and female. Note the positive effect in the treated females (see Evans).

do show some acceleration of their growth rates as compared with their controls.

Hypophysectomized rats treated with the Q extract have been caused to increase their weight at the rate of about 2–3 grams per day for 35 days. This rate of growth cannot be maintained, however, and in the course of some weeks they cease to grow and may actually lose weight in spite of continuous treatment with a known potent extract.

Hypophysectomized rats treated with Q extract show in addition to actual increase in body weight a very definite change in their nitrogen and calcium metabolism. The nitrogen balance changes from a negative to a positive one, as shown by the studies of Mr. Peter Black,

and the calcium balance is influenced in the same direction, as has been shown just recently by Dr. Leonard Pugsley. Skiagrams of the skull

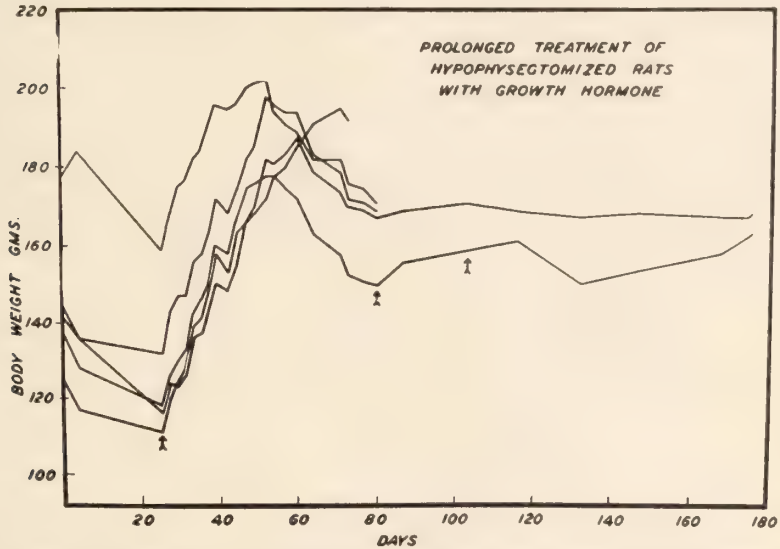


CHART 2. Growth curves of hypophysectomized rats treated with Q extract and fed on adequate diet. Note development of resistance after about 35 days of treatment.

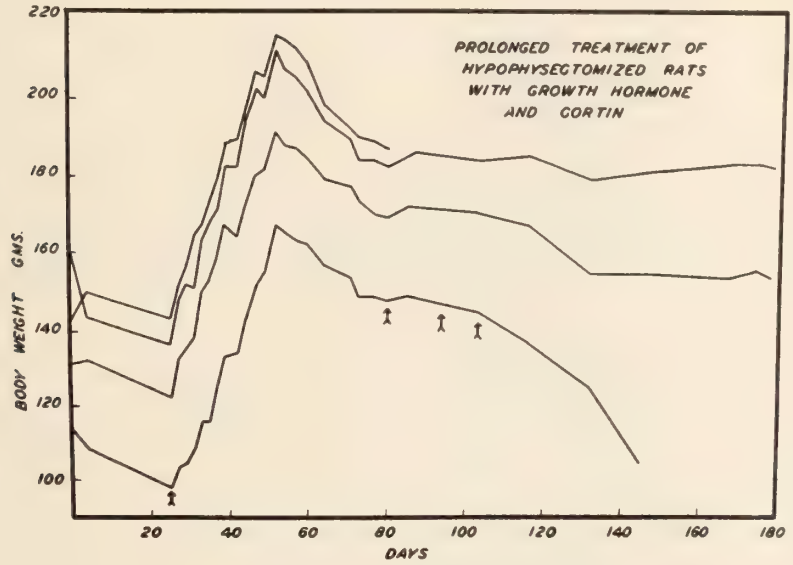


CHART 3. Like Chart 2, but illustrating non-effect of cortin

made under especially devised and controlled conditions in our laboratory by a guest worker, Dr. Hector Mortimer, show clearly that the Q extract

produces very marked changes. The failure of growth of the cancellous elements in the hypophysectomized animal is not only made good, but in certain cases these structures may even become hyperplastic by the suitable exhibition of Q extract.

Chemistry of the growth hormone

The alkaline extract of anterior lobes first described by Evans is very rich in the growth hormone. It contains so much of the other pituitary principles, both active and inert, that an attempt was made to prepare an extract from which as much as possible of these contaminating substances would be removed, at the same time leaving the growth hormone in an

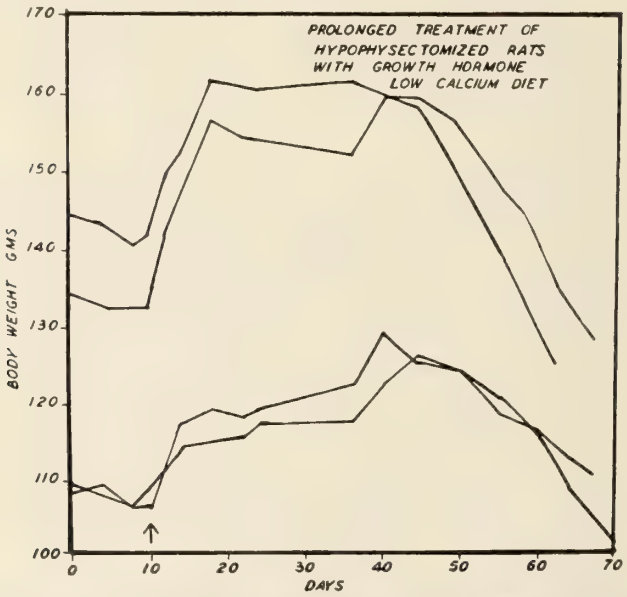


Chart 4. Growth curves of hypophysectomized rats treated with Q extract and fed a low calcium diet. Note the rapid loss in weight after resistance has developed.

active state. Many methods have been tried. It is possible to obtain potent extracts of the growth principle by a variety of procedures, such as extraction of the acetone-dehydrated fresh lobes with either aqueous-alkaline or aqueous-acid media, or acid-acetone or alcohol of 60 per cent concentration, followed by subsequent fractionation with salt, alcohol and acetone, and isoelectric precipitation. If one is desirous of obtaining a relatively pure hormone extract rather than quantitative recovery of the total active principle present in the original gland tissue, the following method may be employed (8).

Desiccated acetone-dehydrated anterior lobes of cattle are ground to a pulp and suspended in ten volumes of distilled water. The mixture is

vigorously stirred and then is made alkaline to the extent of 0.25 per cent NaOH by the addition of the requisite amount of a saturated aqueous solution. The mixture is allowed to stand for two hours. This preliminary treatment with dilute alkali serves a twofold purpose: (1) destruction of any contaminating posterior lobe principles, and (2) facilitating solution of the tissue. Also, the mild hydrolytic action of the dilute alkali is probably of definite value.

The alkaline mixture is treated next with sufficient acetic acid to give a marked flocculation (isoelectric precipitation of the proteins). The pH

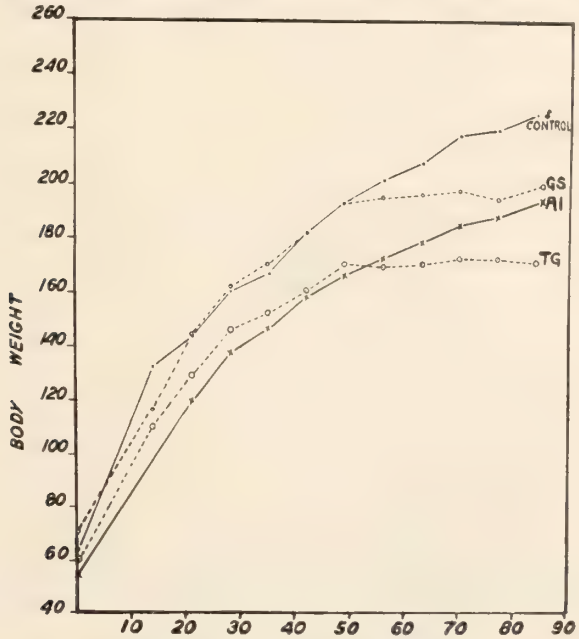


Chart 5. Growth curves of normal male rats treated with: T.G. -thyreotropic hormone; A.I.—adrenotropic hormone; G.S.—a mixture of anterior lobe principles. Note that prolonged treatment with pituitary principles definitely slows the growth rate.

should be about 5.5. Under these conditions filtration of the mixture can be carried out quite rapidly. The residues are suspended in ten volumes of distilled water; the mixture is made alkaline (0.1 per cent NaOH) and again precipitated at the isoelectric point as in the first instance. After filtration the residues are again treated as above, and for a thorough extraction of the gland tissue this part of the process should be repeated five times. The combined filtrates are concentrated at low temperature and pressure to 1/25 to 1/50 the original volume. The concentrate contains the growth hormone, which tends to precipitate out as an isoelectric protein fraction during the concentration process; the

thyreotropic hormone; the adrenotropic hormone; a maturity factor; some prolactin; a ketogenic and a diabetogenic substance. Both of these latter may not be definite entities, as will be seen in the subsequent discussion.

A very satisfactory growth hormone preparation can be obtained by filtering off the flocculence which appears as a result of the vacuum distillation. This precipitate should be dissolved in 0.1 per cent NaOH and reprecipitated at the isoelectric point by careful addition of dilute acetic acid. Flocculation of the isoelectric precipitate is aided by further con-

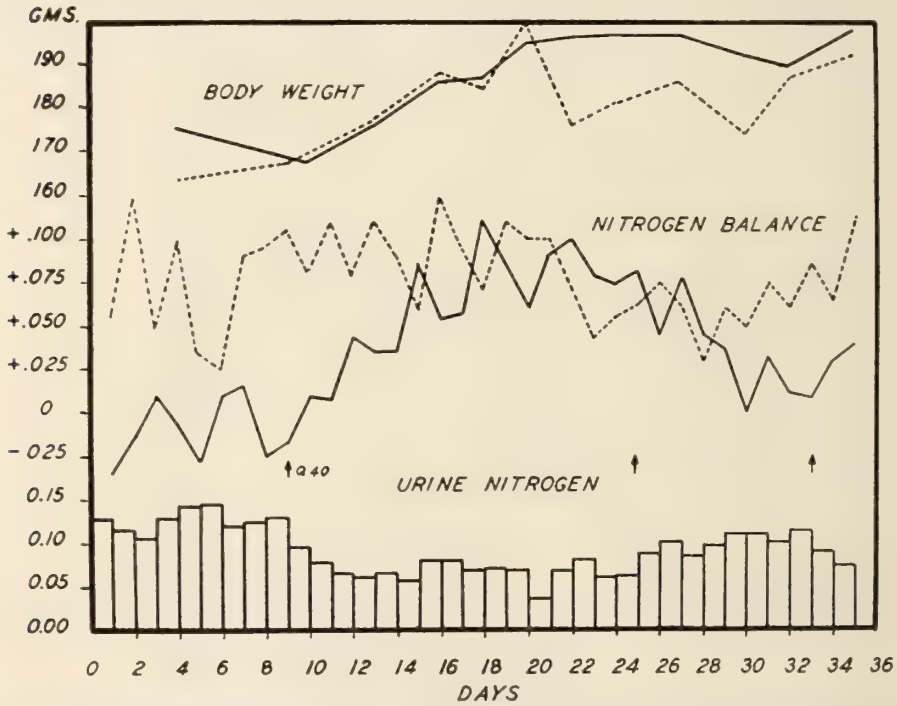


CHART 6. Showing the effect of the growth hormone upon growth, nitrogen balance and urinary nitrogen of completely hypophysectomized rats (solid line) and of normal animals (dotted line). At the first arrow the injections were started; at the second, injections were stopped; and at the third, they were started again.

centration of the mixture at low temperature and pressure. This protein-like fraction should be further purified by repeated isoelectric precipitation.

The filtrates obtained in this process are combined and worked up for the thyreotropic and adrenotropic active principles (9, 10).

The best growth hormone preparations are made by treating the concentrate of the combined original filtrates with $Ca_3(PO_4)_2$ in the presence of 1 per cent ammonia (8). The suspension of calcium phosphate in the concentrate is best produced by adding separately, during vigorous agitation, $CaCl_2$ and NaH_2PO_4 in appropriate amounts. Agitation of the

mixture is maintained by further concentration in the vacuum still. The mixture is filtered and the filtrate is washed with dilute ammonia water (0.05 per cent) until the filtrate is colorless. The $Ca_3(PO_4)_2$ mass is suspended in water and made alkaline with NaOH (0.5 per cent). The mixture is filtered and the whole process is repeated three times. The combined filtrates are neutralized with acetic pH 6 and concentrated at low temperature and pressure to a small volume. The precipitate is removed by filtration and after solution in dilute soda again precipitated at the isoelectric point. The solution of the precipitate in dilute alkali represents the final product. One such preparation sterilized by Berkefeld filtration

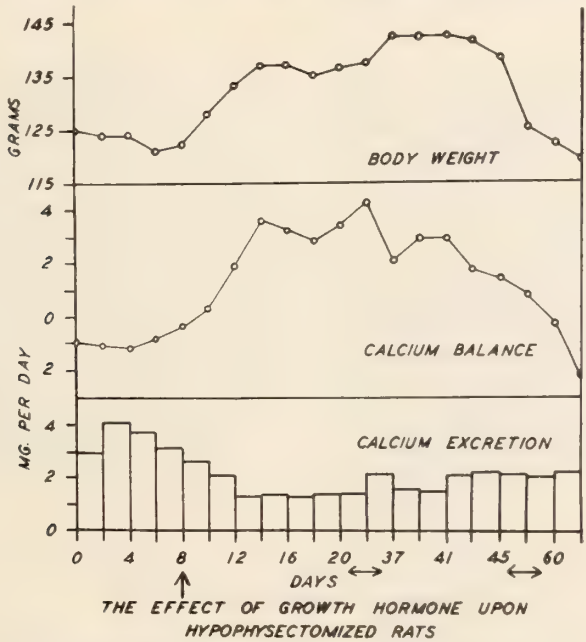


Chart 7. Showing the favorable effect of Q extract upon calcium balance in hypophysectomized rats maintained on a low calcium diet (Dr. Leonard Pugsley).

at pH 9 has shown no evidence of losing its activity over a period of one year. This has been stored in a refrigerator at about 1°C.

The growth hormone may be standardized by noting the growth effect upon recently hypophysectomized and otherwise untreated rats. We have taken as an arbitrary unit the amount of extract necessary, when administered twice daily by intraperitoneal injection, to cause a weight increase of 1 gram per day in 100 gram rats, over 10 to 15 days (8). Extracts made by the method outlined above may contain from 25 to 100 units per cubic centimeter representing 1 gram of original pituitary tissue.

SEX

Another important effect of hypophysectomy is the atrophy of the genital organs. The germinal epithelium of the testis atrophies and sperm cell formation stops. In the ovary follicle maturation and corpus luteum formation is inhibited and the animals become continuously dioestric. But the effect of the pituitary on the ovary is not limited to the maturation of follicles; in fact we have been able to show that the so-called "maturity hormone" is as important for the immature ovary as it is for the mature one. Before puberty, there is no follicle maturation, nor oestrus, nor corpus luteum formation, but the ovaries of prepubertal hypophysectomized animals still show definite signs of hypophyseal deficiency (39).

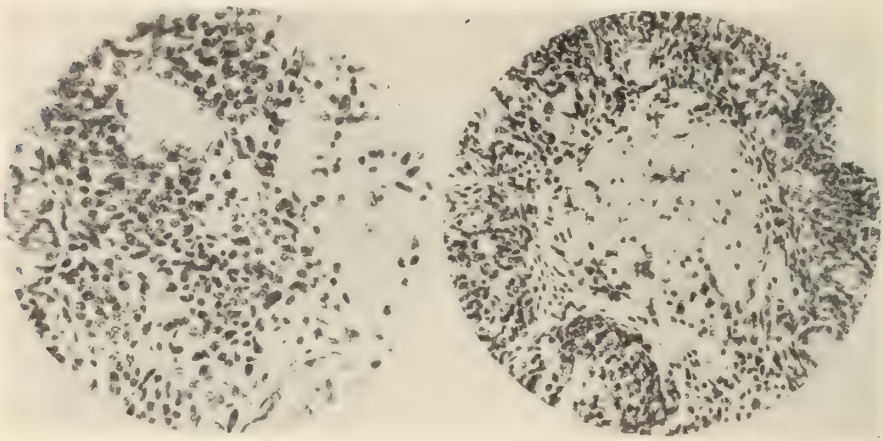


FIG. 1 FIG. 2

FIG. 1. Ovary of hypophysectomized rat two months after hypophysectomy. The theca cells are changed into theca-deficiency cells and their nuclei show the typical wheel shape.

FIG. 2. Involuted corpus luteum in ovary of hypophysectomized post pubertal rat 265 days after hypophysectomy.

The thecal cells, which ordinarily have a spindle-shaped nucleus and a fine granular chromatin structure, change their appearance. The nuclei become circular and their chromatin aggregates in large, dark lumps, peripherally arranged, leaving white, chromatin-free spaces in between, so that the nucleus comes to present a somewhat wheel-like appearance. In order to stress the origin and significance of these cells, we called them "theca deficiency-cells" (11). It has been possible to prepare suitable extracts, which will prevent or cure the effects of hypophysectomy on the gonad, and the study of replacement therapy has also led to some interesting findings concerning the difference between the various gonadotropic extracts. Thus we have found, in confirmation of P. E. Smith

and others, that gonadotropic extracts prepared from pituitary tissue will lead to follicle maturation and corpus luteum formation in the hypophysectomized rat. In this respect the gonadotropic hormone of the pituitary differs from the anterior-pituitary-like hormone prepared from pregnancy urine or placenta (A.P.L.); in fact we have never been able to stimulate follicle maturation or corpus luteum formation in the absence of the hypophysis with A.P.L. (7, 40). It would be erroneous, however, to think that A.P.L. is quite ineffective in the hypophysectomized rat. Although its administration does not produce true corpora lutea, it leads to the luteinization of thecal cells and to the production of so-called "thecal corpora lutea." The main difference between the two types of gonadotropic hormones appears to be, therefore, that the pituitary hormone acts on the granulosa and on the theca, while A.P.L. luteinizes the theca only. In this respect our findings are not quite in accordance with those of P. E. Smith, who has obtained true corpora lutea by the administration of pregnancy urine preparations. It is interesting to note, however, that we repeated his experiments in our laboratory with commercial "antuitrin S" without being able to produce any results other than thecal luteinization (12). We have no explanation to offer for this discrepancy, except possibly that the "antuitrin S" used by Dr. Smith—which, as he told us, was a special preparation—was different from the commercial "antuitrin S." The difference in the morphogenetic effect of the two gonadotropic hormones is not the only one, for it has been possible to show that A.P.L. leads to continuous oestrus in the hypophysectomized adult female, while this is not the case after administration of the pituitary extract. In the case of the immature hypophysectomized female, oestrus has not been obtained after A.P.L. administration, although the thecal luteinization was very marked. These observations led to more detailed study of the effects of hypophysectomy and hypophyseal hormones on the theca cell.

The theca deficiency-cells, as described above, can easily be brought back to normal by the administration of A.P.L.; in fact, we have seen that they may be stimulated to such a degree as go take on the appearance of corpus luteum cells. The confinement of A.P.L. action to the theca cells is observed not only in the hypophysectomized animal but also in the *very* immature rat. Administration of A.P.L. to these during the first days of life results in thecal luteinization. It is generally known that rats under 14 days of age are not suitable for the Aschheim-Zondek reaction, for they will not form corpora lutea under the influence of pregnancy urine. An histological study of ovaries of such animals showed, however, that their gonads are by no means insensitive to A.P.L. The only difference between the somewhat older rat and the very immature animal is that the former reacts with corpus luteum formation, while the latter with the formation of thecal corpora (13). These observations led

us to the conclusion that the pituitary of the very immature rat is probably not fully functional, and that this accounts for the fact that it reacts to A.P.L. in the same way as the hypophysectomized older animal.

The conclusion which we drew from all these experiments was that A.P.L. needs a complementary factor produced by the pituitary in order to act on the granulosa cell, while its effect on the theca is not necessarily dependent upon the pituitary (14, 15). This conception has also been substantiated by other experimental series, in which we found that continuous administration of A.P.L. leads to an enlargement of the pituitary and of the thyroid, as well as to development of the mammary gland to the stage corresponding to that of late pregnancy (16, 17).

The preparation of extracts containing the maturity principle of the anterior lobe

The preparation of even a relatively pure maturity hormone extract of the anterior pituitary has not yet been accomplished. There are more difficulties to be overcome in relation to the purification of this principle than in the case of any other. The great variation in the yield of active principle seen in the glands of different species is of especial interest. In our hands ox glands have been quite unsatisfactory as a source of potent extracts, whereas glands of sheep and hogs have been found to be relatively very rich in maturity principles. Others have had a similar experience in their work on pituitary gonadotropic hormones. If frozen rat pituitary glands are implanted into immature females, the gonadotropic effect is only a fraction of that obtained when fresh glands are implanted in a similar manner. Since an alkaline extract of the anterior lobes of the ox has been shown to be capable of neutralizing the oestrus effect of a potent alkaline extract of the rat's pituitary when both are administered simultaneously to the immature rat, one must recognize the existence of inhibitory substances of either a specific or non-specific nature in the fresh glands and accept as a possibility that a negative gonadotropic effect of a certain extract may be due not to absence of a maturity factor but to an inhibitory substance neutralizing the effect of an oestrogenic factor. We have frequently failed to obtain any vaginal oestrus reaction with certain pituitary extracts which have produced a definite A.P.L. ovary in immature rats. Methods of preparing gonad stimulating extracts of the anterior pituitary have been published by Van Dyke and Wallen Lawrence (18, 19, 20); Evans, Meyer and Simpson (21); Hisaw, et al. (22, 23); and others (24, 25, 26, 90).

Our best maturity extracts have been made by extracting the anterior lobes of sheep or hog with 30 per cent acetone containing 1 per cent NH_4OH. The maturity factor appears to follow the thyreotropic principle, and methods useful in purifying the latter are applicable to the purification of the former. In general these consist in isoelectric precipita-

tion of relatively inert protein materials and concentration of the active principle by ammonium sulphate precipitation of the isoelectric filtrates, solution in water of the ammonium sulphate precipitate and precipitation from this by alcohol or acetone (70 per cent) of the active material. Salts can be removed successfully from the final extracts by dialysis. Extracts which have been made in this manner can be boiled at pH 5 for one hour without any appreciable change in the potency as regards maturity principle, whereas such treatment causes almost a complete destruction of the thyreotropic substance. This is the best evidence we have to submit that the thyreotropic and maturity factors are different substances. We do not feel, however, that it is fully adequate to settle entirely this question.

Pregnancy

In all probability the pituitary plays an important rôle during pregnancy. It has been possible, however, to show that hypophysectomy during the second half of pregnancy does not interfere with the maintenance of gestation. The only effect of hypophysectomy, when performed in the second half of pregnancy in rats or mice, is a marked prolongation of the gestation period (27, 28). This is most probably due to a delayed involution of the corpus luteum of pregnancy. We have found, however, in confirmation of Pencharz and Long (29), that hypophysectomy in the early stages of gestation leads to resorption of the embryos in the rat. We have been able to show that the same is true in the mouse, while the guinea-pig seems to behave differently; for we have seen that pregnancy was not interfered with in a guinea-pig hypophysectomized during a very early stage of gestation.

If the maintenance of the corpus luteum of pregnancy is not interfered with by hypophysectomy, the question arises—what is responsible for keeping this corpus luteum in a functional condition? It is very likely that the pregnant uterus itself is responsible for this, since removal of the foetuses leads to immediate involution of the corpus luteum of pregnancy. In order to determine whether the presence of the embryo as such is essential, or whether the distention of the uterine wall is the important factor, Dr. Selye (30) performed the following experiment: In a series of pregnant rats, the uterus was emptied and melted paraffin was introduced into its cavity, so as to distend it. When these rats were killed six weeks after the operation their ovaries were considerably enlarged (fig. 3) and contained a large number of corpora lutea comparable to those of pregnancy. The mammary glands, however, had completely retrogressed. It seems from this experiment that the mere distention of the uterine wall as such has a great effect upon the ovary. The involution of the mammary glands is not necessarily an indication of a deficiency in corpus luteum hormone production, since it is well known that even the continuous administration of corpus luteum hormone by injection cannot

maintain the mammary gland in a fully developed condition for more than a few weeks. These experiments are insufficient to draw any definite conclusion concerning the rôle that uterine distention plays during pregnancy, but they certainly prove that the distention of the uterus has a marked effect on the ovary. We should be inclined to assume that this effect is also attained through a stimulation of the pituitary, since the hypophyses of our experimental animals—the uteri of which had been distended—were greatly enlarged. These experiments remind us of those performed by Loeb (31) on the guinea-pig, which showed that hysterectomy greatly prolongs the life-span of the corpus luteum in this species. Since hysterectomy has no clean-cut effect on the ovaries or the cycle in the rat, we as-



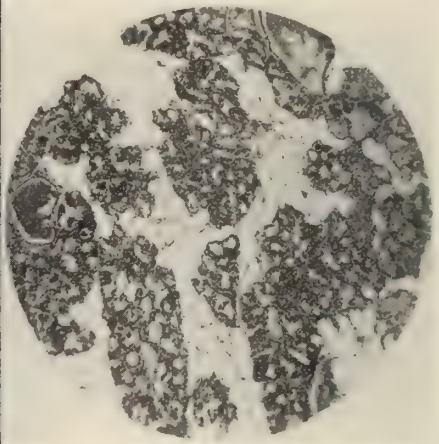


FIG. 3 FIG. 4

FIG. 3. A pair of greatly enlarged ovaries, taken from a rat the uterus of which had been distended with paraffin, beside a pair of normal ovaries.

FIG. 4. Fully lactating mamary gland in a suckling pseudopregnant mouse.

sume that the mechanism at work after hysterectomy differs from that after uterine distention.

Lactation

The development of the mammary gland is not interfered with (27, 32) in rats and mice hypophysectomized in the latter half of gestation. Milk secretion starts normally at parturition. This, however, lasts for but a few hours, then definitely stops. The mammary gland involutes. If hypophysectomy is performed during the course of an already established lactation, milk secretion stops within a few hours (6). As you know, it has been possible to produce a lactation-promoting hormone from the pituitary. Oscar Riddle, whose work on this subject has been

of considerable importance in the elucidation of the problems of lactation and crop milk secretion, has called this hormone "prolactin." It is likely that this prolactin stimulates the secretion of the mammary gland (33, 34). Our experiments—showing that a short period of lactation may be observed soon after delivery, in animals from which the pituitary has been removed a long time before—seem to indicate that the hypophysis is not absolutely essential for the secretion of milk. There might possibly be an extra-hypophyseal source of the lactation-promoting hormone. We have considered the possibility that the pregnant uterus may also yield prolactin, and that the short lactation period observed after delivery in the hypophysectomized animal may be the result of a release of prolactin from the pregnant uterus. We know that the corpus luteum inhibits lactation, and therefore a lactation-promoting hormone would probably not lead to milk secretion during the life of the corpus luteum of pregnancy; but as soon as this corpus luteum ceases to function, lactation starts.

In this connection we performed the following experiments. A group of rats were injected with A.P.L. until their mammary glands were fully developed, and then castrated. Forty-eight hours later a histological study of the mammary glands showed that lactation had set in. In this case, the removal of the considerably luteinized ovaries initiated milk secretion in the mammary gland of the non-pregnant animal.

In another series, we treated a group of rats with A.P.L. in exactly the same manner as in the previous experiment. We then castrated them, and removed the hypophysis at the same time. Under these conditions, no milk secretion was observed. Our conclusion was that the removal of the ovary, with its corpora lutea, stimulated the secretion of prolactin from the pituitary, and thereby initiated milk secretion. If the pituitary was removed, milk secretion could not occur. If we compare the results of these experiments with those on pregnant animals, as previously described, we see that the only difference between them is the presence of a pregnant uterus. It is suggestive, therefore, to assume that this pregnant uterus was responsible for the initiation of milk secretion following parturition (17, 35).

In order to determine whether the pregnant uterus is able to produce prolactin at any time during gestation, we removed the foetuses and the pituitary simultaneously during the second part of pregnancy, and we found that Caesarian section, which ordinarily initiates milk secretion, is unable to do so in the absence of the pituitary. Animals impregnated at the postpartum cycle immediately after delivery of a litter (thus pregnant and lactating at the same time) were hypophysectomized. Milk secretion ceased immediately. Thereupon we came to the conclusion that the substance which stimulates milk secretion in the hypophysectomized animal is probably released from the pregnant uterus only shortly before parturition (36).

It is well known that weaning stops milk secretion. The explanation of earlier workers was that the accumulation of the products of secretion within leads to pressure atrophy of its epithelium, and thereby stops secretion. In the light of the "prolactin" theory, we were interested to see whether the stimulus of suckling has any direct effect on the production of prolactin in the pituitary. If this were so, one would have to assume that the mere nervous stimulus of suckling maintains milk secretion during the whole lactation period, through an effect on the prolactin production of the hypophysis. In order to test this, Dr. Selye trancised all the galactophores in lactating mice and rats while the stimulus of suckling was maintained. In this experiment no milk could escape from the gland and secretion still persisted, as long as the litter was suckling. This experiment indicates that the accumulation of milk in the gland is not the immediate cause of inhibition of secretion after weaning. In the animal from which the young have been weaned milk secretion stops because the nervous stimulus of suckling is absent (37).

The fact that the nervous stimulus of suckling has so definite an effect upon the pituitary throws an entirely new light upon the question of lactation dioestrus and lactation amenorrhoea. The fact that sexual cyclicity stops during lactation, both in experimental animals and in humans, has been interpreted as the result of the drain upon metabolism during this period. It has also been thought that it is not lactation which interferes with menstruation, but that the initiation of menstruation has an adverse effect upon lactation. In the above experiments it seems that the oestrous cycles do not appear in nursing mothers, even though the galactophores are cut. In this condition, there is no milk secretion and thus no drain on the metabolism. We thought, therefore, that the inhibition of sexual cyclicity during lactation may also be due to the nervous stimulation of suckling.

Another group of experiments was done to see whether the stimulus of suckling would also inhibit sexual cyclicity in the non-lactating animal. In a group of adult normal female rats and mice we studied the effect of the stimulus of suckling upon the oestrous cycle. We found that an adult rat, if given a litter of young animals, will build a nest and try to nurse the litter in many cases. If the mammary gland of such a rat is examined about ten days later, growing mammary epithelium is seen. At the same time the ovaries contain large corpora lutea similar to those seen during pregnancy and pseudo-pregnancy. No follicle maturation occurs and vaginal smears show continuous dioestrus. This condition is very similar to the so-called pseudo-pregnancy produced by sterile copulation or stimulation of the vagina with a glass rod. During the later stages of this pseudo-pregnancy produced by suckling, the mammary gland is well-developed and frequently numerous large placentomata are found in the uterus (figs. 4, 5). Still later, lactation sets in (Selye and McKeown (38)).

This type of pseudo-pregnancy is particularly interesting because it may have a parallelism in humans. While sterile copulation does not interfere with the cycle in women, the stimulus of suckling has a definite inhibitory influence as shown by lactation amenorrhoea. We would be inclined to interpret this condition as the result of the nervous stimulation of the nipple. These experiments may also give a more satisfactory explanation of the fabulous accounts of various investigators who claim that milk secretion may be initiated in virgin girls who have attempted to quiet an infant by offering it the breast.

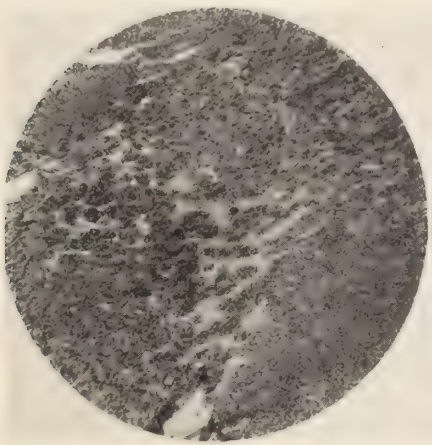


FIG. 5

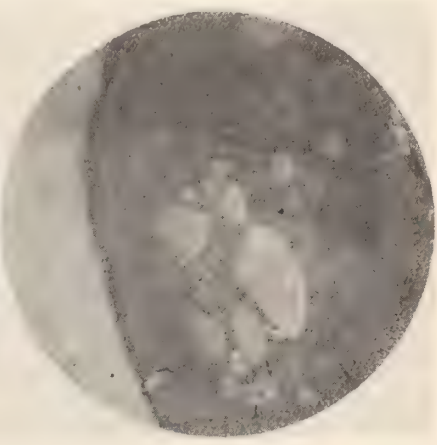


FIG. 6

FIG. 5. Placentoma in the uterus of a pseudopregnant mouse
FIG. 6. Cysts in the adrenal cortex of a pseudopregnant mouse

Testis

We have confirmed the observations of previous investigators concerning testicular atrophy which follows removal of the hypophysis in experimental animals. We also found, in confirmation of Philip E. Smith, that this atrophy can be prevented by the daily administration of hypophyseal implants. Our results differ, however, from those of Smith, insofar as the effect of A.P.L. is concerned. Administration of even large doses of A.P.L. has consistently failed to stimulate sperm cell formation in hypophysectomized rats. The interstitial tissue hypertrophy which follows A.P.L. administration in the normal animal is not influenced by the removal of the gland, but—just as in the normal—this hormone has no effect on the seminal epithelium after hypophysectomy (7).

In this connection it is interesting to note that the very immature male rat seems to react in the same manner to A.P.L. as does the older animal, the only clean-cut effect being proliferation of the interstitial tissue. Un-

like the ovary, the testis reacts in the same manner after A.P.L. administration in the immature or hypophysectomized rat as it does in the mature male.

THYROID

That there is a very close relationship between the anterior pituitary and the thyroid glands has been very clearly established both experimentally and clinically. Cushing (1912) (40) observed in the dog that, following a transient hyperplasia occurring about 24 hours after hypophysectomy, involution of the gland ultimately resulted. Allen reported that the thyroid of tadpoles became atrophic following removal of the pituitary, and he noted that the implantation of the pituitaries of frogs caused a restoration of the thyroid to normal (41). P. E. Smith obtained similar results in the case of the white rat (43).

Clinical evidence pointing to the control of the thyroid by the pituitary has been abundantly available. Graubner (44), in a review of 34 cases of hypophyseal cachexia (Simmonds' disease) reported in the literature, found that in all cases the thyroid was reported as being small and atrophic and sometimes even sclerotic. As a result of the considerable experience which we have had in our own laboratory with hypophysectomized animals, we can confirm these findings in regard to the atrophic changes in the thyroid of dogs, monkeys, guinea-pigs, mice and rats from which the hypophysis has been removed.

Hyperplasia of the thyroid gland has been produced in a number of different species of animals by injections of anterior pituitary extracts. This fact completes the chain of evidence proving that the anterior pituitary normally exercises a controlling influence over the thyroid by means of an internal secretion.

Animals in which the thyroid stimulating action of the anterior pituitary has been conclusively demonstrated are the guinea-pig (Loeb and Bassett, 1929, 45; Aron, 1930, 46, 47; Janssen and Loeser, 1931, 48; Krogh, 1932, 49; Grab, 1932, 50), the cat (Schittenhelm and Eisler, 1932, 51), the dog (Houssay, 1932, 52), the rabbit (Baumann and Marine, 1932, 53), the pigeon (Riddle and Polhemus, 1931, 54), the duck (Schockaert, 1932, 55), and the rat (Anderson, 56, and Anderson and Collip, 1933, 9). Some of these workers reported failure to produce hyperplasia in the thyroid of the rat. It is of particular interest therefore to note that Dr. Evelyn Anderson, working with us, *was able to produce marked thyroid hyperplasia with hyperthyroidism in the rat treated with crude pituitary extract plus staphylococcus aureus vaccine.* Junkmann and Schoeller have found that the pituitary of the rat is relatively very rich in the thyreotropic substance compared with the pituitary of the guinea-pig, as determined by implantation into test guinea-pigs, and that the rat is much less sensitive than the guinea-pig to the thyreotropic hormone.

In this connection, I should venture to suggest that it *may follow as a general rule that the sensitivity or responsiveness of an animal to injected*

FIG. 7 FIG. 8

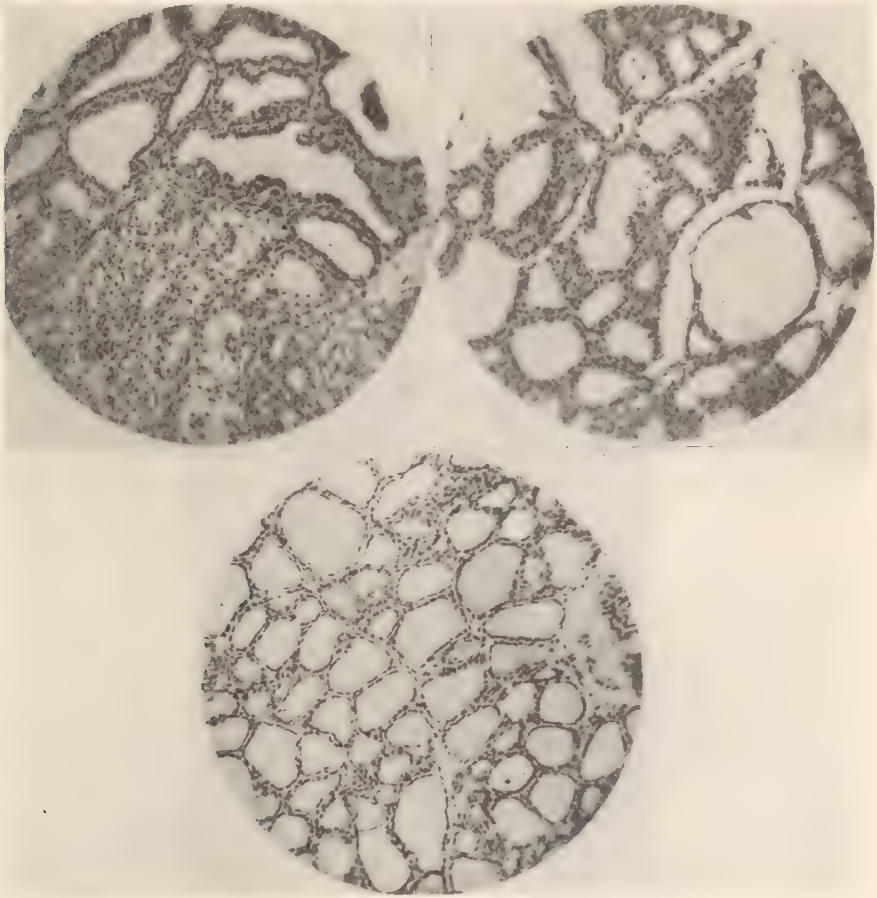


FIG. 9

FIG. 7. Control thyroid of goitrous rat. Weight 143 mg., metabolic rate 86 per cent of normal.

FIG. 8. Thyroid of goitrous rat after 9 days treatment with thyreotropic hormones. Note large vesicle, with flattened epithelium, filled with dense colloid. Weight 138 mg., metabolic rate 230 per cent of normal.

FIG. 9. Thyroid of normal rat after 74 days treatment with thyreotropic hormone. Note similar appearance to that seen in untreated hypophysectomized rat.

hormone varies inversely with the hormone content or production of the animal's own gland.

Hyperplasia of the thyroid of the rat has been produced by other means

than the injection of highly potent thyreotropic hormone. Thus McCarrison has observed thyroid enlargement and hyperplasia in rats to which have been fed cultures of bacteria from the faeces of goitrous persons. We have seen extreme hyperplasia without hyperthyroidism in certain rats obtained from a dealer and kindly supplied to us by Dr. C. N. H. Long of Philadelphia, who had noted the condition and was so kind as to send them on to us for use in our work.

The use of a non-specific agent such as a killed culture of staphylococcus aureus in conjunction with anterior pituitary extracts in order to produce thyroid hyperplasia and hyperthyroidism became quite unnecessary after we had succeeded in preparing the thyreotropic principle in concentrated and purified form.

Preparation of the thyreotropic hormone

The presence of the thyreotropic principle can be demonstrated in almost any type of simple extract of anterior pituitary glands. A variety of methods are therefore available for the preparation of extracts rich in this hormone. Loeser (58) described a method for preparing an active extract in the form of a dry powder. His process consisted of aqueous ammoniacal extraction of the acetone treated glands followed by removal of proteins with trichoracetic acid and precipitation of the active substance by acetone from the trichoracetic filtrate. Alcohol and acetone were subsequently used as precipitation reagents. Junkmann and Schoeller (59) have reported on the chemical properties of the thyreotropic extract.

The method which we use to prepare an active extract is as follows: The combined filtrates obtained at the $Ca_3(PO_4)_2$ adsorption stage in the Q process for growth principle are concentrated and saturated with $(NH_4)_2SO_4$. The precipitate is taken up in distilled water and again precipitated with $(NH_4)_2(SO)_4$. Alcohol is added to the neutral aqueous extract of the precipitate to make 70 per cent by volume of this reagent in the mixture. The precipitate is collected on a filter and extracted with distilled water. An equal volume of acetone is added and the precipitate is collected on a filter and extracted with distilled water. This solution represents the final product, but further purification for the purpose of reducing the content of contaminating adrenotropic principle can be accomplished by repeated precipitation from 50 per cent acetone.

Most excellent preparations of the thyreotropic plus some adrenotropic hormone can be prepared by working up the combined filtrates from the above process by concentration and precipitation from 90 per cent alcohol.

The physiology of the thyreotropic hormone

The administration of adequate amounts of the thyreotropic hormone to normal animals results in the course of a few days in enlargement and hyperplasia of the thyroid. There is an increase in the metabolic rate

(Siebort and Smith, 57), (Verzar and Wahl, 61), increased heart rate (Schittenhelm and Eisler, 51), exophthalmos (Schockaert, 55), (Loeb and Friedmann, 61), a reduction of the iodine content of the gland (Loeser, 58; Schockaert and Foster, 62), an increase in the alcohol-insoluble iodine of the blood (Closs, Loeb and MacKay, 63; Grab, 64; Schittenhelm and Eisler, 51), a depletion of liver glycogen and an increase in the acetone bodies in the blood (Eitel and Loeser, 65; Eitel, Löhr and Loeser, 66). Verzar and others have shown that none of the signs of hyperthyroidism can be produced in thyroidectomized animals by injections of thyreotropic hormone extracts (60).

Since the guinea-pig is exceedingly sensitive to the thyreotropic hormone, we made use of this animal as a test object in our earlier work on the purication of extracts.

The metabolic effect of bi-daily injections of an active extract into a group of 16 prepubertal guinea-pigs consisted of an average increase of 129 per cent on the 4th day and 134 per cent by the 6th to 8th day. The animals were killed after one week of injections, and the thyroid glands were more than doubled in size as compared with the controls; and the histological picture was that of extreme hyperplasia. Our Q extract and A.P.L. tested in a similar manner gave negative results.

From a study of the changes in metabolism from day to day in guinea-pigs and rats injected with the thyreotropic hormone, it is evident that there is a preliminary rise sometime within the first four days. This is followed by a secondary rise in about a week. This latter rise is not maintained, and a decline to normal or even subnormal levels gradually takes place. Since it has been shown by a number of workers that, following the injection of the thyreotropic hormone, there occurs an outpouring of thyroid secretion, one might suggest that the first rise in metabolism is due to the sudden discharge of existing stores of thyroid hormone into the blood stream, while the second rise follows after the hyperplasia of the gland, induced by the hormone, has advanced sufficiently to give an increased production of the thyroid hormone. The subsequent decline in metabolic rate has been made a subject of special study in our laboratory, but I shall defer until a little later a full discussion of our results.

The average increase in metabolic rate which we have seen in normal rats of our colony, treated with the thyreotropic hormone, has been +35 per cent. The administration of even massive doses of the hormone does not result in higher values. We obtained quite different results, however, with a small series of goitrous rats to which reference has already been made. A control animal in this group had a thyroid gland weighing 142 mgm. as compared with a normal rat's gland of 20 mgm. The gland proved, on microscopic examination, to be extremely hyperplastic. The control metabolic rates of these animals was slightly subnormal. Immediately following treatment with thyreotropic hormone

the metabolic rate rose rapidly. One animal showed a 95 per cent increase within 24 hours. The highest rate observed in the group was 262 per cent above normal. This was on the ninth day of injections. All of the rats showed definite symptoms of hyperthyroidism, irritability, weakness, exophthalmos and excessive sweating, and there was a 20 per cent loss of weight in the course of nine days.

Hypophysectomized rats show a decline in the metabolic rate to an average of 74 per cent of normal as determined on a series of 118 of our experimental animals. The thyroid gland decreases in weight and the microscopic picture is one of marked involution of the cellular elements. We have found that these animals are much more sensitive to injections of the thyreotropic hormone than are normal animals. They compare very favorably in this respect with the guinea-pig. The metabolic rate has frequently been restored to normal within a week with bi-daily doses of as little as 0.005 cc. of a purified thyreotropic extract. The normal rat has required at least 0.08 cc. bi-daily to give a similar response. We have chosen as an arbitrary unit of the thyreotropic hormone the minimum amount, administered daily in two injections, which will cause a rise of 20 per cent in the metabolism of the hypophysectomized rat by the fourth day. We believe that this unit compares fairly well with the Junkmann-Schoeller unit as determined by the use of the normal guinea-pig but it has this advantage—that the metabolism of the hypophysectomized animal, both before and during treatment, is far less variable than the histological picture of the guinea-pig's thyroid. The normal guinea-pig thyroid is extremely sensitive to the thyreotropic hormone stimulus, but unfortunately control animals all too frequently, in our experience, have shown mild thyroid hyperplasia.

We have no evidence of our purified thyreotropic extract causing growth in hypophysectomized animals that have been treated for some weeks. Thus, 40 hypophysectomized rats had an average weight of 121 gm. before injections of the thyreotropic extract were commenced, and an average weight of 110 gm. after 3–4 weeks.

Effects of the thyreotropic hormone on metabolism

It is well known that thyroid feeding causes a creatinuria (Cramer and Krause, 1913). Dr. David Barr observed an increased creatine excretion in a patient given our T.G. extract. It is of interest, therefore, to compare the effects of thyroid feeding and of thyreotropic hormone injections upon the creatine excretion in relation to the changes produced by each in metabolic level. This part of the work has been carried out by Dr. L. Pugsley and Dr. Evelyn Anderson. The feeding of desiccated thyroid to normal rats caused a rise in the creatine excretion which reached a peak on the 10th day. The creatine excretion then gradually decreased, while the metabolic rate was still rising. The thyreotropic hormone

caused a temporary increase in creatine excretion, both in normal and hypophysectomized rats. As in the case of the metabolic rate response, the former were less sensitive than the latter. Six units caused a definite increase in excretion in the normal rats, and one unit acted similarly in the hypophysectomized animals. An increased creatine excretion was likewise noted in the dog treated with the thyreotopic extract. Purified extracts of the growth and adrenotropic hormones had no effect on the creatine excretion of normal rats.

We see here two definite examples of the principle which I enunciated above; namely, *that the responsiveness of an animal to an administered*

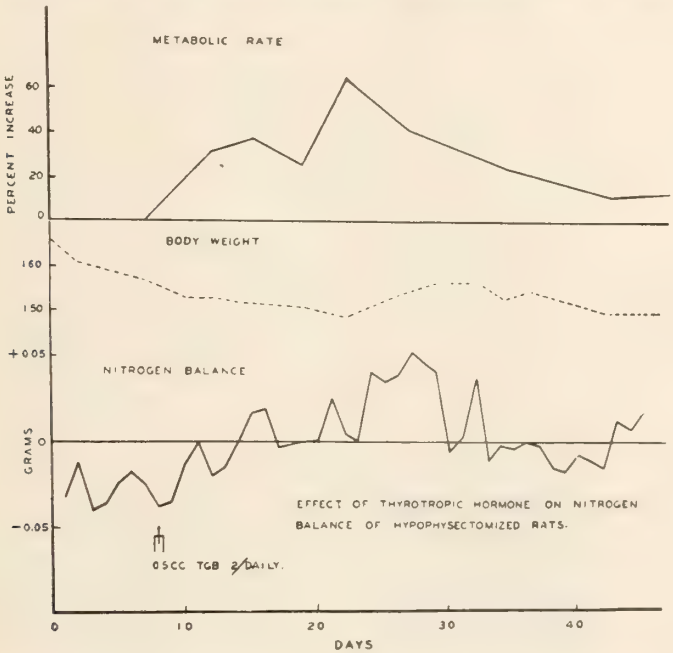


Chart 8. Effect of the thyreotropic principle upon nitrogen balance in hypophysectomized animals (Mr. Peter Black).

glandular extract may vary inversely with the hormone content or production of the animal's own gland. The principle may be illustrated by a specific example. The pituitary of the rat is relatively rich in the thyreotropic substance; the thyroid gland of the normal rat is relatively very active and the metabolic rate is accordingly relatively high. The normal rat is relatively insensitive to thyreotropic hormone. The hypophysectomized animal cannot produce thyreotropic hormone; the thyroid gland of the animal is relatively inactive and the metabolic rate is depressed, *but the sensitivity to injected thyreotropic hormone is at least ten times greater than in the case of the normal rat.*

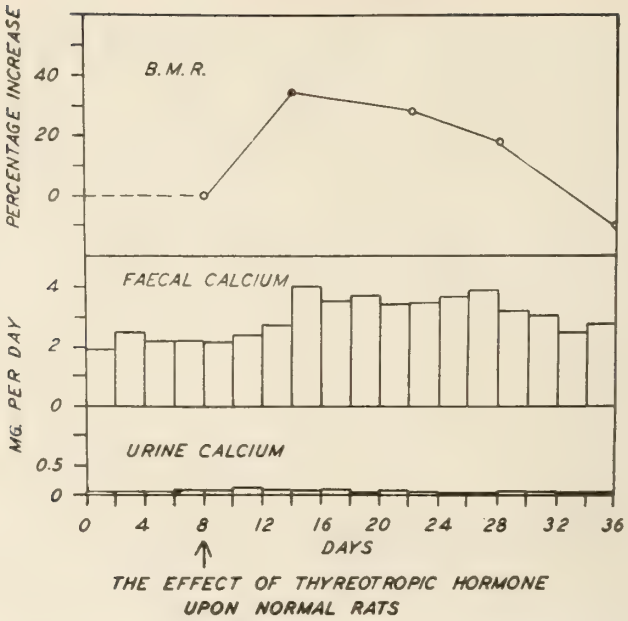


CHART 9 Effect of the thyreotropic extract upon calcium excretion (Dr. Leonard Pugsley).

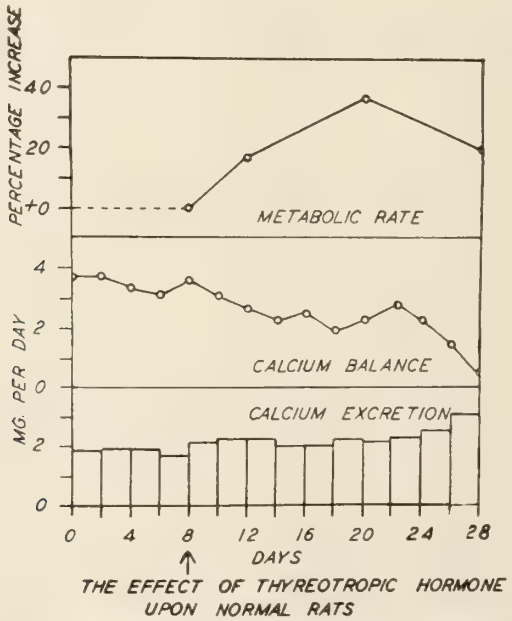


CHART 10. Effect of the thyreotropic hormone upon the calcium balance of normal rats (Dr. Leonard Pugsley).

Mr. Peter Black has extended the study of the effects of thyreotropic hormone extracts to fish. Here the effects are in general as they are in the mammal. The interesting observation was made, however, that untreated fresh fish placed in the water in which injected fish had previously been kept likewise showed an increase in the metabolic rate. The addition of the hormone to the water in which untreated fish were kept had no effect. It appears, therefore, that, in the case of the fish (cat-fish) the injection of thyreotropic hormone causes the liberation into the water of a substance which can be taken up by another fish with a resultant increase in metabolism of the latter animal. Further investigation along these lines will be carried out to determine if possible whether it is the true secretion of the thyroid which is passed into the water from the thyroid gland of the injected fish.

One of the effects of thyroid feeding is an increase in the calcium excretion by the bowel (91). Doctor Pugsley has been able to demonstrate a similar, though not so marked, effect in normal animals injected with the thyreotropic hormone which occurred only during a period of elevated metabolic rate.

A remarkable demonstration of the fact that the thyreotropic hormone has a direct action upon the thyroid cells has been given by Eitel, Krebs and Loeser, who produced hyperplasia in sliced thyroid tissue treated in vitro with an active thyreotropic extract. Houssay, Biasotti and Magdalena, and Marine and Rosen (92) have likewise obtained a reaction in transplanted thyroids.

ADRENAL

While the earlier workers, like Aschner, found no adrenal cortical atrophy in hypophysectomized dogs, more recent observations (Smith and others) have shown that definite atrophy of the adrenal cortex follows the removal of the hypophysis in rats. We were able to confirm these observations on the rat, and furthermore found that similar atrophy of the adrenal cortex may be produced in mice, guinea-pigs and monkeys. It is remarkable that the cortical atrophy which is so obvious after removal of the hypophysis in rats, mice and cats is not very marked in the hypophysectomized dogs so far examined by us. In the case of a dog hypophysectomized one month before autopsy, the width of the adrenal cortex was not markedly less than that of the normal control litter mate.

Histologically this cortical atrophy is characterized first by an intense hyperaemia of the cortico-medullary junction; then the zona fasciculata and zona reticularis of the cortex show definite signs of atrophy (fig. 10). The cells degenerate, and the cortex becomes progressively narrower. Numerous pigment cells appear in the zona reticularis, which contain yellowish-green granules. Such cells may also appear in this zone in the normal rat during old age, but they are never found in young animals, and even in the senile rat they are never as frequent as they are after hypophysectomy.

Preparation of the adrenotropic hormone

The alcohol and acetone filtrates which are obtained in the preparation of the thyreotropic principle are combined and concentrated at low temperture and pressure. The aqueous concentrate is saturated with am-

FIG. 10

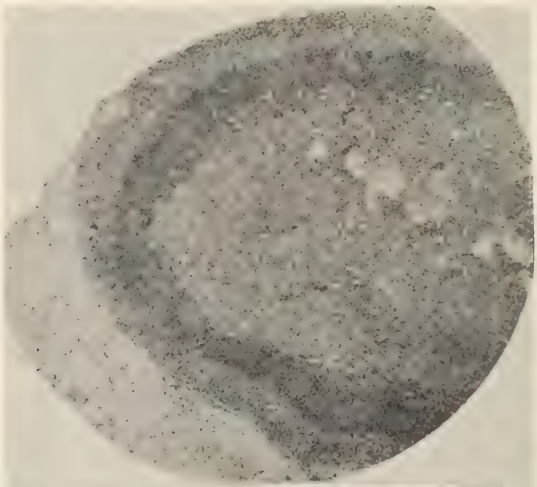


FIG. 11

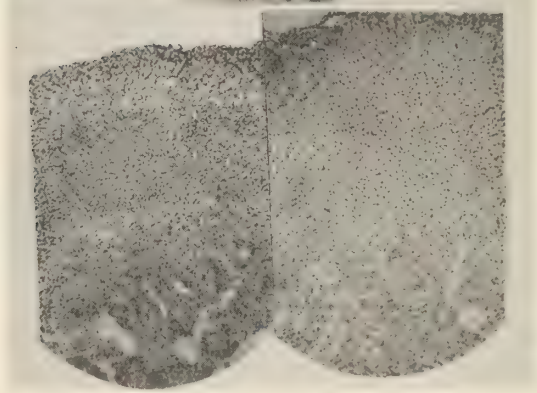


FIG. 10. Cortical atrophy in rat 265 days after hypophysectomy.

FIG. 11. Cortical repair with adrenotropic hormone 139d ays after hypophysectomy. Left—control biopsy weight 3.5 mgm. Right—6 days after treatment weight 7 mgm.

monium sulphate and the precipitate is removed. It is extracted with 1 per cent aqueous ammonia and the extract is dialyzed, to remove the $(NH_4)_2SO_4$. After dialysis the extract is treated with ten volumes of absolute alcohol and the precipitate is removed and extracted with dilute aqueous alkali (0.05 NaOH). This extract is neutralized to pH 6 with

dilute acetic and allowed to stand at 1°C. for some days. The precipitate which has formed is removed and dissolved in either dilute acid pH 3 or dilute alkali pH 9. This isoelectric fraction which is obtained in the above manner is almost free of thyreotropic hormone and can be shown to be rich in adrenotropic principle by the following method of assay devised by Dr. Evelyn Anderson.

The left adrenal is removed from hypophysectomized rats ten days to two weeks following the operation. This gland is weighed and sectioned for microscopic examination. The animal is injected twice daily for six days with the extract to be tested. The animal is killed and the right adrenal is weighed and sectioned, as is also the thyroid gland. Control experiments have shown that there is no compensatory hypertrophy of the remaining gland after unilateral adrenalectomy in the hypophysectomized animal. Increase in weight of the remaining adrenal over that of the one taken at biopsy, together with microscopic evidence of cortical repair is taken as positive evidence of adrenotropic activity in the extract. The presence or absence of thyreotropic hormone can be determined in the same test animals by noting whether there is any increase in metabolism during the period of injections and if there is any evidence of increased cellular activity in the thyroid, taken at the post-mortem examination. It has been only in isoelectric fractions that we have obtained negative tests for thyreotropic hormone.

The purified adrenotropic hormone extract has been shown to withstand prolonged boiling at pH 5.

Physiological effects of the adrenotropic hormone

As yet we have very little detailed information on the physiological effects of the adrenotropic hormone. No appreciable improvement has been seen in the cachectic condition of the hypophysectomized rat treated with the active extract, even though a substantial degree of repair of the atrophic cortex has taken place (fig. 11). Normal animals injected with the extract have not shown any marked changes in the size or histological appearance of the adrenals. Dr. Pugsley has obtained, in a preliminary study of the effect of the adrenotropic extract upon the calcium and potassium balance of normal rats, very suggestive evidence that, during the first four days of the administration of the hormone, the potassium balance tends to become less positive, whereas no effect was noted on the calcium balance.

PARATHYROID GLANDS

Hypophysectomy has produced no detectable changes in the parathyroid glands of the rats in our series. We can confirm Houssay that the parathyroids of the hypophysectomized depancreatized dog become atrophic. We have seen in one case a large focus of necrosis at the centre

of one parathyroid, while the other showed definite signs of atrophy (fig. 13). We have seen definite enlargement of the parathyroids of the cat within two weeks of hypophysectomy. It is possible that there

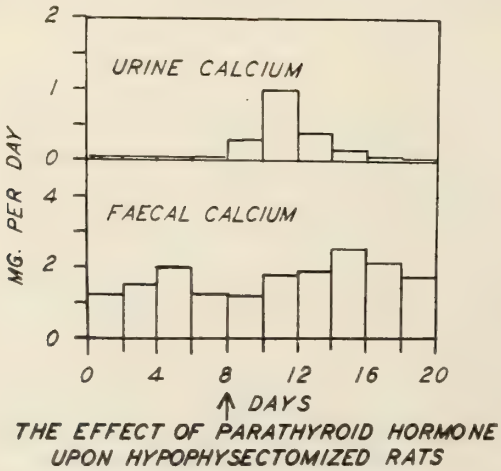


Chart 11. Showing that parathyroid hormone produces a hypercalcuria in the hypophysectomized rat (Dr. Leonard Pugsley).



Fig. 12. Action of parathyroid hormone on bone of normal as compared with hypophysectomized rat. N—Normal. H –Hypophysectomized. N.P.—Normal treated. H.P.—Hypophysectomized treated.

may be an early stage of parathyroid enlargement and over-activity which is later followed by atrophic change. Blood serum calcium of the hypophysectomized rat is normal or slightly increased. The calcium balance tends to be negative, but it has been restored to a definite positive value by treatment with the growth hormone (Pugsley) (67).

Hypophysectomized rats treated with the parathyroid hormone respond to it in the same manner as normal animals (Pugsley) (68) insofar as the early hypercalcuria is concerned (chart 11).

The effect of parathyroid hormone on the bone is quite different when applied in very large doses in acute experiments and in chronic experiments. While this hormone leads to bone resorption and formation of many osteoclasts in the acute experiment, the same substance leads to the formation of osteoblasts and to bone apposition when administered daily over long periods. We found that the same dose of parathyroid hormone which would lead to bone apposition and osteoblast formation

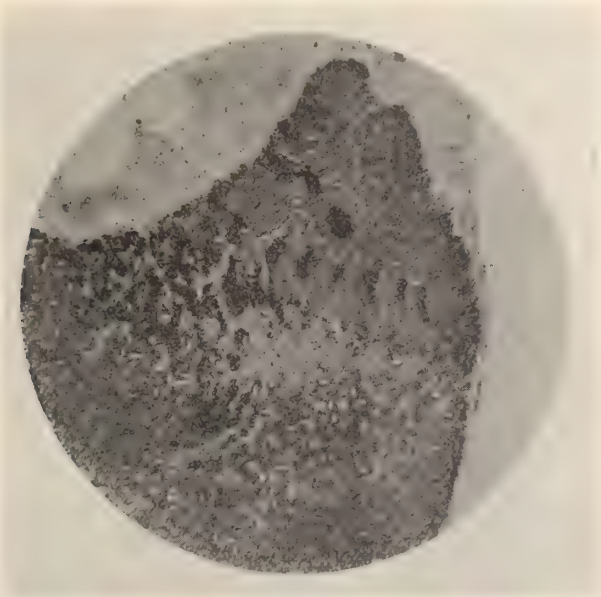


FIG. 13. Necrosis in the parathyroid of a pancreatectomized hypophysectomized dog, 10 weeks after hypophysectomy.

in the normal animal leads to bone resorption in the hypophysectomized one. It seems, therefore, that the formation of new bone tissue is interfered with in the absence of the hypophysis (fig. 12).

THYMUS

The literature on the effect of hypophysectomy on the thymus is somewhat contradictory. P. E. Smith (1930) (69) saw no specific changes in the thymus of the hypophysectomized rat. Richter and Wislocki (1930) (70) noted enlargement of the thymus and lymph glands of the rat. Koster (1930) (71) found the thymus enlarged in the hypophysectomized dog. Sakamoto and Saito (1932) (72) described a condition of fatty degeneration

in the thymus of hypophysectomized rabbits Kapran (1932) (73) observed involution of the thymus of the dog after hypophysectomy. Our observations on the thymus of the hypophysectomized rat are in agreement with P. E. Smith's. We have frequently seen enlargement of the thymus in rats treated with certain extracts of anterior lobe for some weeks. The new tissue which could be separated from the old on account of the slightly lighter color of the new lobes proved on examination to be lymphatic in type. This effect has been noted in chronic experiments in which extracts rich in the adrenotropic hormone have been used. The significance of this is not yet understood, but it may be stated that there is suggestive evidence that certain of the blood-forming organs may be



FIG. 14. A typical Houssay dog 11 weeks after second operation

influenced by anterior pituitary principles. Miss Margaret Hill is studying this phase of the problem.

The diabetogenic and ketogenic effects of anterior pituitary extracts

Burn and Ling (1930) (74) demonstrated that rats on a salt butter diet, injected with an alkaline extract of anterior lobes, excreted large amounts of acetone bodies in the urine. Hoffmann and Anselmino (1931) found that certain anterior lobe extracts caused an increase in the acetone bodies of the blood and also lowered the basal metabolism (75, 76). Funk (1932) (77) confirmed Hoffmann and Anselmino and stated that the fat hormone could be obtained from both normal and pregnancy urine. Magistris

(1932) (78, 79) found an increase in the acetone bodies of the blood of rabbits treated with an aqueous extract of acetone dried powder pituitary preparation. He reported also a lowering of the metabolic rate. He was of the opinion that the fat metabolism hormone was not identical with the thyreotropic, growth or maturity factors.

Rietti (1932) (80) noted a decreased acetone excretion following either pancreatectomy or phloridzin administration to hypophysectomized as compared with normal dogs.

Evans (1933) reported that he had produced glycosuria in a female dog and obesity in a male animal by injections with his preparation of the growth hormone.



FIG. 15. Two hypophysectomized monkeys 10 weeks after operation

Houssay, et al. (1933) (82) reported that anterior lobe extracts inhibited the hypoglycaemia of hypophysectomized animals and increased the glycosuria, diuresis, and acetone body excretion of hypophysectomized depancreatized animals. Barnes has reported somewhat similar results.

It is impossible to know from the earlier work whether the so-called diabetogenic principle and the so-called ketogenic principle are one and the same. It is possible that in each case we are dealing with a special physiological effect of one of the known pituitary hormones. The lowering of metabolism that has been observed by Hoffmann and Anselmino and by Magistris may have been due to the secondary effect of the thyreotropic principle. Using the Burn-Ling test object as a method of assay,

Mr. Peter Black has been studying the ketogenic action of the various extracts of anterior lobe with which we have been working. This work has not yet advanced to the stage where final conclusions can be drawn, but the results so far obtained would tend to support the view of Magistris that the ketogenic substance is distinct from the thyreotropic substance.

The diabetogenic substance can be studied to best advantage in the Houssay dog, i.e., in the depancreatized and hypophysectomized animal. Dr. Barnes very kindly tested some of our extracts on his Houssay animal last year. Diabetogenic activity was found by him in both the growth and the thyreotropic fractions. We are at present in our own laboratory attempting to build up a colony of Houssay dogs together with a number of hypophysectomized animals of different species. We have been able to confirm Houssay, Barnes and others in regard to the effect of hypophysectomy upon the diabetic condition of totally depancreatized animals.

We have lost some of our completely hypophysectomized monkeys from hypoglycaemia and one Houssay dog died presumably from hypoglycaemia. This particular animal was an exception to the general rule as regards the blood sugar. Fasting values of 50 mgm. had been observed previous to death. The treatment with extracts to which this animal had been subjected no doubt contributed in part to the unusual blood sugar values which had been observed over a period of many days. These points will be discussed in detail later. I would like to mention here that we have lost four of our hypophysectomized cats approximately ten days after hypophysectomy all of which showed histological signs of liver degeneration.

ANTI-HORMONES

It has been a matter of great interest to those working in endocrinology to note in the case of many laboratory animals and also in the case of many patients, that a state of lowered reactivity, of increased resistance or of actual non-responsiveness may gradually become manifested in those that have been treated for a long period with some glandular extract. Likewise, it has been observed that certain previously untreated animals or patients may be non-responsive to injections of a known potent glandular extract. We have only to think of the failure of the parathyroid hormone to affect appreciably the blood serum calcium of the rabbit or of the patient who is resistant to enormous doses of thyroid extract.

It was therefore a matter of more than usual interest to us when we found in chronic experiments on animals in which the thyreotropic hormone was injected twice daily over a long period that the animals not only failed absolutely to give a positive metabolic response, but actually showed a lowering of the metabolism to the level of that of hypophysectomized animals (83). The thyroid glands of the chronically injected animals became atrophic and the thyreotropic hormone was absent from their own pituitary glands (fig. 16). In my Washington lecture to the Congress

of Physicians and Surgeons published last September, I asked the following questions anent this remarkable fact:

"Does the thyroid gland develop an immunity to the injected hormone?

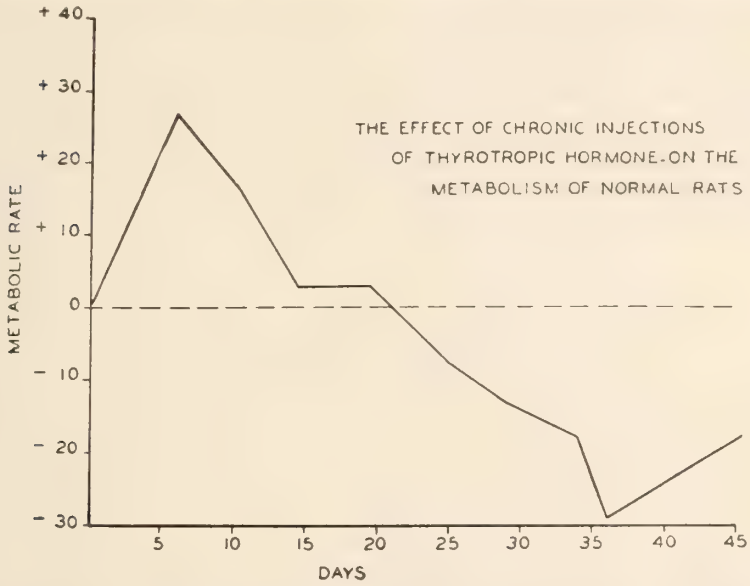


Chart 12. The average metabolic rate curve of a group of normal rats injected daily with the thyreotropic hormone. Note the fall to subnormal levels after 30 days treatment.

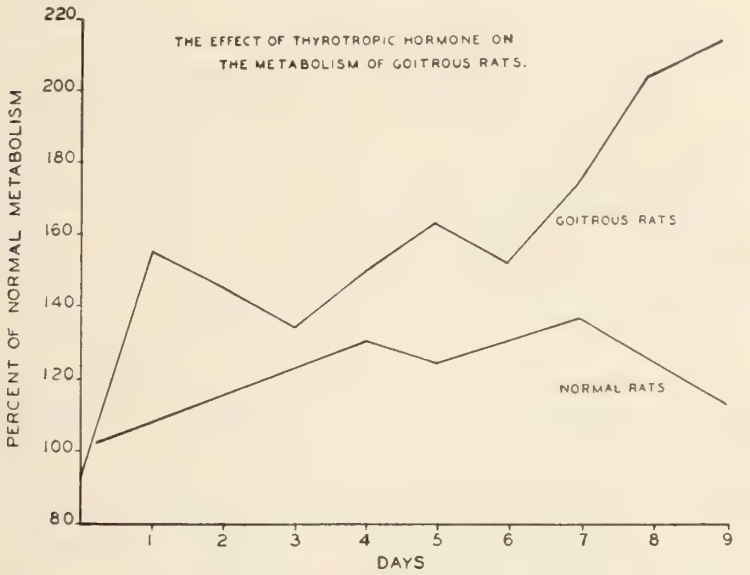


Chart 13. A comparison of the metabolic response in normal and goitrous rats treated with the thyreotropic hormone.

"Is some inhibitory mechanism brought into action by the continued stimulation with the thyreotropic hormone?

"Does the purified extract used contain as well a true inhibitory principle which has a definite latent period before its effects become manifested?"

In the light of our recent experiments, our second question would appear to be the most pertinent. Dr. Evelyn Anderson and I have been able to demonstrate most positively that the blood serum of the thyreotropic hormone resistant rats contains a substance, which we propose to call the antithyreotropic hormone, which when injected into normal rats confers upon them, for a time, resistance to the elevating effect of the thyreotropic hormone on the metabolic rate. Furthermore, we have extended our

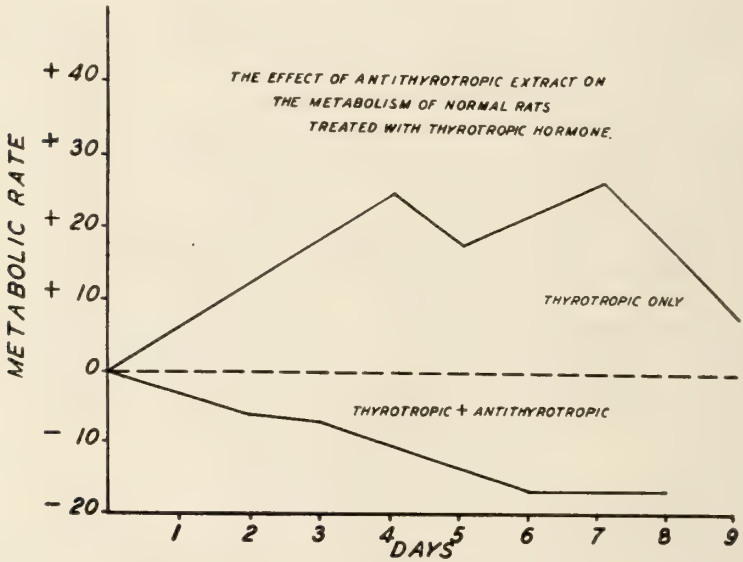


CHART 14. The demonstration of the anti-thyreotropic effect of the purified extract of horse serum from an animal injected with the thyreotropic hormone.

studies to other species, and we have produced the antithyreotropic hormone substance in the blood of the rabbit, goat, dog and horse, by daily injections of adequate amounts of the thyreotropic hormone extract. Dr. Carl Bachman has obtained negative results with the active serum using the complement fixation and precipitin tests. This encouraged us to prepare serum-protein-free extracts of the antithyreotropic blood. This proved to be entirely feasible and now concentrated and highly active antithyreotropic hormone extracts are a fact (83).

We have adopted as a working hypothesis the view that antihormones are present in the normal subject. If this is true then the production of some of those antihormone substances which we have reported can be looked upon as an increasing of the level of a substance or substances

which are normally present. This broad principle is particularly attractive, since it may be used to explain such things as the great difference in

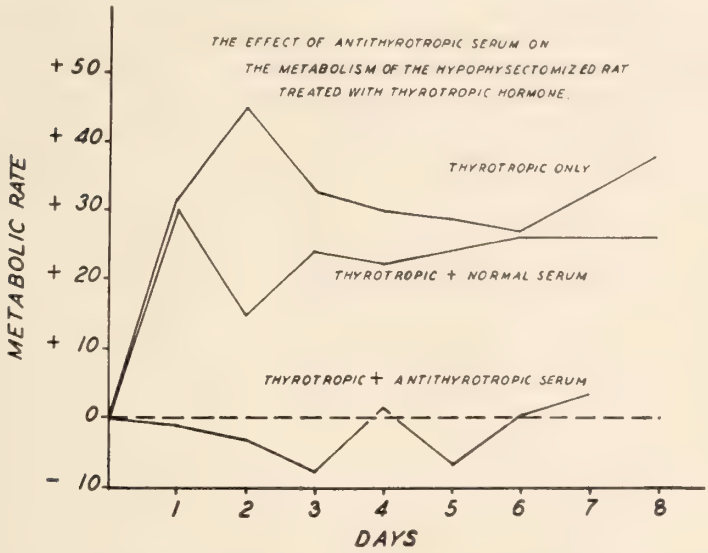


Chart 15. The metabolic effect in hypophysectomized rats treated (1) with thyreotropic hormone (2) thyreotropic hormone + normal serum (3) thyreotropic hormone + anti-thyreotropic serum.

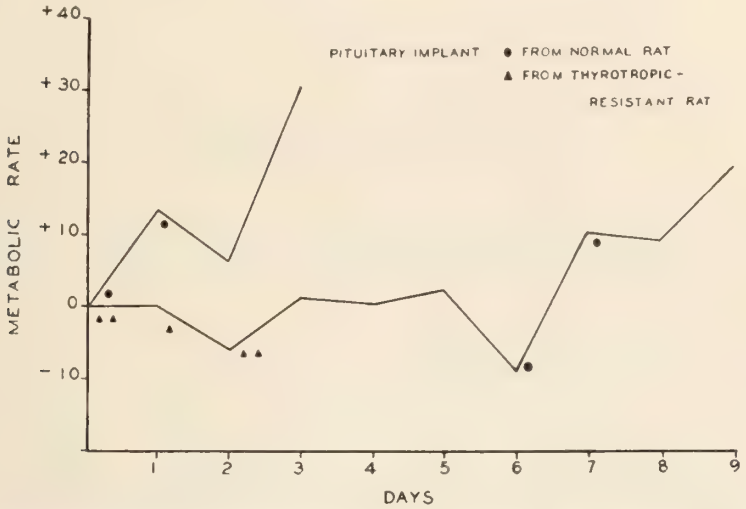


Chart 16. Showing absence of thyreotropic principle in the pituitary of the normal rat treated for some weeks with the thyreotropic extract. Upper curve (control) shows the effect of implantation of two normal pituitary glands and lower curve shows the non-effect of implantation of five pituitaries from chronic thyreotropic hormone treated rats. Later the implantation of two normal glands caused a sharp rise in the metabolic rate as shown on the lower curve.

the responsiveness of different species to hormones, as well as minor variations in responsiveness within a species. The extreme case is illustrated by the hypophysectomized animal, which shows not only a lack of thyreotropic hormone, since the seat of its production has been destroyed, but a decrease in the antithyreotropic substance, which is shown indirectly by the increased sensitivity to the thyreotropic extract. It is possible, in view of this, that many apparent hypoglandular states may be due to an increase in antihormone level.

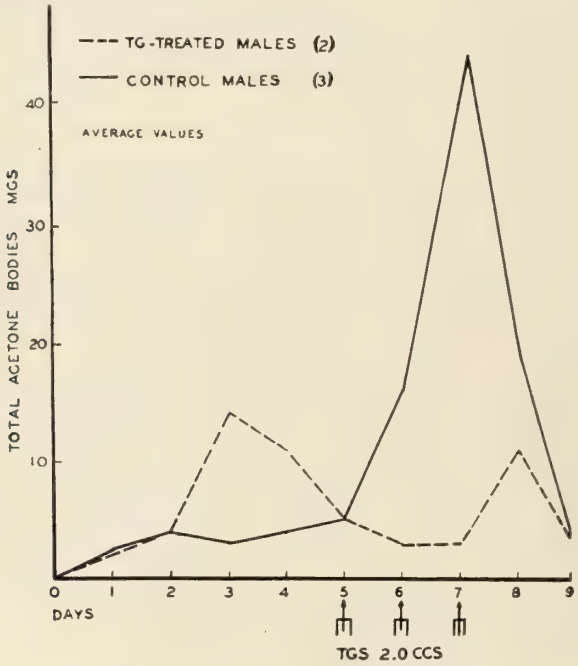


CHART 17. Showing the ketogenic effect of thyreotropic extract T.G. in normal rats and the non-effect of similar treatment in normal animals treated for some weeks with the thyreotropic extract (Mr. Peter Black).

The detection of an antihormone in the blood is already possible in the case of the antithyreotropic substance.

One of the most important implications of this theory of "inverse response" is that the level of a hormone is related directly to the level of the corresponding antihormone. The demonstration of a hyperhormone state, associated with lowered responsiveness to injected hormone, implies the co-existence of a hyper-antihormone state. One might here draw an analogy between the highly buffered solution which is sluggish in regard to pH change on addition of small amounts of acid or alkali, and the hormone resistant animal which is, as it were, well buffered by a high level of hormone and antihormone substances in its system.

That the effect of a small dose of a hormone will be greater when the existing concentrations of hormone and antihormone circulating are small than when they are already large, will not be regarded as surprising. In many cases of physiological anatognism between drugs, it is known that the *ratio* between the concentrations of the two antagonists determines the physiological effect, whatever the actual amounts; this has been shown for the interaction of atropine and pilocarpine on salivary secretion (86), of atropine and acetylcholine on the frog ventricle (84, 87), of adrenaline and ergotamine on the rabbit uterus (88) and elsewhere. The *ratio* will

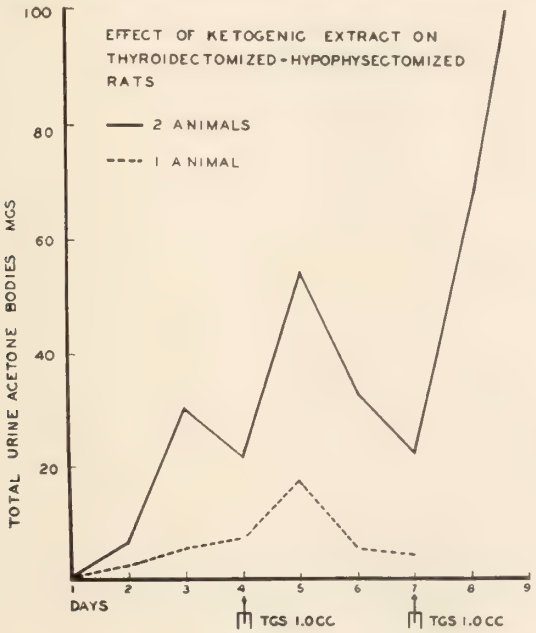


CHART 18. Showing that the ketogenic effect can be obtained in an otherwise untreated hypophysectomized-thyroidectomized animal by the administration of an anterior pituitary extract, T.G. (Mr. Peter Black).

obviously be more disturbed by a given *amount* of hormone when the quantities of hormone and antihormone present are initially small.

The facts which have been proven with regard to the thyreotropic hormone suggest that the principle of *inverse responsiveness* may apply very generally. If it can be shown that somewhat similar conditions hold in the case of other hormones, then a general law—that of "*inverse response*"—may exist. There is already existent considerable support for this as a general basic view.

We have found that the growth hormone has no effect upon the rate of growth of young male rats and only a slight positive effect in the case of females (chart 1). Hypophysectomized animals, male or female, are ex-

ceedingly sensitive to the growth hormone. Immature female rodents are extremely sensitive to the various forms of oestrin. Thyroidectomized animals show an increased sensitivity to thyroid extract (93). Hypophysectomized animals are much more reactive to the diabetogenic substance than are normals.

Other examples of apparent non-reactivity to hormones resulting from chronic treatment are to be found in the literature. Akimoto found that rabbits showed little or no increase in blood sugar after adrenalin administration provided they had been previously treated with adrenalin for

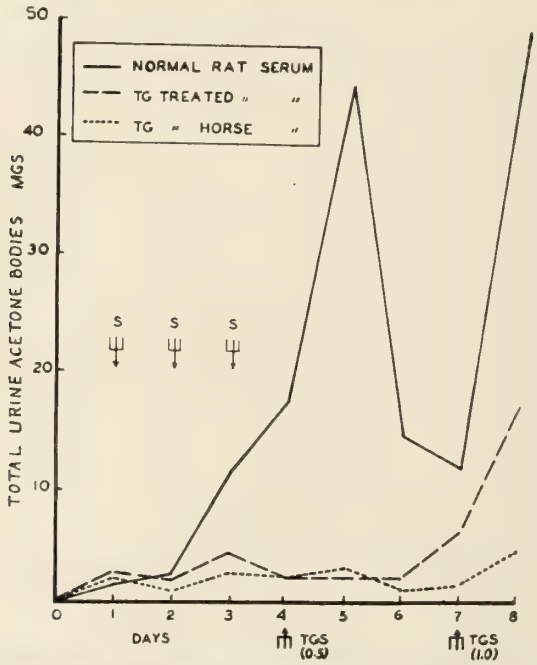


Chart 19. Showing anti-ketogenic effect of serum of the rat and horse treated with thyreotropic extract for some weeks as compared with the non-inhibitory effect of normal serum.

10–20 days. Zondek reported that mice treated with prolan first showed great increase in ovarian weight but that after a certain time the weight of the ovary was normal in spite of continued injections of prolan. Aron confirmed these observations in the guinea-pig, and further showed that the same loss of sensitivity developed after chronic treatment of the guinea-pig with pituitary gonadotropic extracts. Our own results on rats treated with A.P.L. or pituitary implants confirm these findings; and we were able to show also that the ovaries of such chronically treated animals not only return to normal weight but often to subnormal size and show definite histological evidence of severe atrophy.

De Fremery, Luchs and Tausk (85) made the observation that by continuous administration of corpus luteum hormone one is unable to maintain the uterine mucosa of the rabbit in a progestional stage for more than approximately 17 days. After this the mucosa atrophies whether the hormone administration is continued or not. Hartman and Winter have observed recently that adrenalectomized animals treated with cortin over a long period may become non-responsive and show definite signs of cortical deficiency, although they are treated with large amounts of a potent cortical extract. Loeb and Friedman (1931) observed that guinea-pigs treated with thyreotropic anterior lobe extract lost their sensitivity after a period of 15–17 days. Aron (1932) obtained a similar result. In our own extensive experiments with the purified hormone on rats we have confirmed and extended these observations to the point where the nature of the mechanism underlying such reactions has become manifested.

We have been able to demonstrate that rats become non-responsive to the gonadotropic effect of the anterior pituitary-like hormone of the placenta and also to the maturity factor present in fresh rat pituitary by repeated daily treatment with these substances. It is of special significance that in the non-responsive state, the gonad may become smaller than in the normal and show definite signs of atrophy. Ovaries that have reached this state as a result of chronic A.P.L. treatment still respond to the gonadotropic substance in fresh pituitary implants. Similarly ovaries that have become resistant to the gonadotropic hormone of implants still respond to the placental hormone. Furthermore, the blood serum of rats injected for many weeks with A.P.L. has been shown to inhibit the ovary-stimulating effect of A.P.L. in the immature animal. Also the blood serum of an A.P.L. chronically injected rabbit has been shown to inhibit A.P.L. in the immature rat.

Hypophysectomized rats which have been treated for some weeks with our purified growth extract have ceased to grow and indeed have actually shown a decline in the growth curve even though the injections of known potent extract have been continued (chart 2). A group of such growth hormone resistant animals were sacrificed and the blood serum of these was pooled. A suggestive result was obtained when this serum was used in conjunction with a standard growth extract. The test object, a recently hypophysectomized rat, did not show as great a growth response as did the control treated with growth extract plus normal serum. Since, for complete inhibition of the growth hormone action, a very definite amount of antihormone must be required in relation to the growth hormone used, a new method of testing for the antigrowth principle was devised. This consists in the continuous injection twice daily of a standard dose of Q extract. Antiserum is given in addition as soon as a definite growth effect is manifested. A positive effect consists in a slowing or the complete

inhibition of the growth effect of the Q extract. In the course of a few days, when this has become established, normal serum is substituted for the antigrowth serum. Growth is then resumed as in the first period. Antiserum is again introduced until growth ceases or is greatly slowed and again the positive effect is restored by normal serum used in place of the antigrowth serum being tested.

Our antigrowth serum has been prepared by injecting a horse daily with the Q extract.

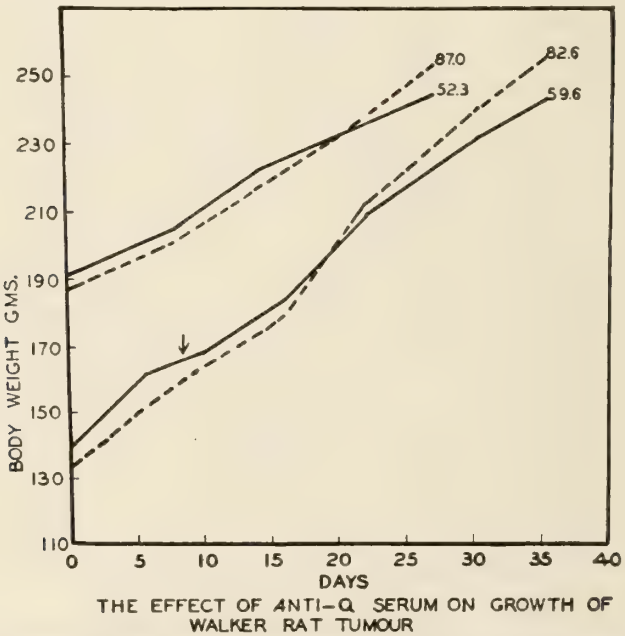


Chart 20. Growth curves of rats bearing the Walker tumour and treated with the anti-Q horse serum. Note that the average weight of the tumours in the case of the treated animals (broken line) was considerably less than in the controls (5 animals in each group) (Dr. C. S. McEuen).

Dr. C. S. McEuen has been studying the effects of various hormones on the Walker-rat tumour. Since the most positive type of inhibitory influence upon the growth of this tumour was shown to be manifested after hypophysectomy (McEuen and Thomson) (89) and since therefore there is evidence that the rapid growth of this tumour is related to a normal if not to a hyperfunctioning anterior pituitary of the host, Dr. C. S. McEuen has carried out some preliminary experiments in which horse serum from the animal treated with Q extract has been injected into tumour bearing animals. The results of this preliminary test are highly suggestive (chart 20) and justify the further work along these lines which is being undertaken. The chief difficulty in the way of a practical appli-

cation of the antigrowth principle is suggested by the failure of an antigrowth serum, which has been shown to be potent by the method outlined above, to affect appreciably the rate of growth of normal rats. This is due very probably to the great functional reserve which the normal pituitary must possess. Much more valuable information will be at hand when we have had an opportunity to complete a series of experiments in which the effects of continuous injections, for long periods, of antihormone principles of various types have been ascertained.

ANTI-DIABETOGENIC PRINCIPLE

As stated before, there is no positive evidence as yet as to whether the diabetogenic effect of anterior pituitary extracts is due to a specific princi-

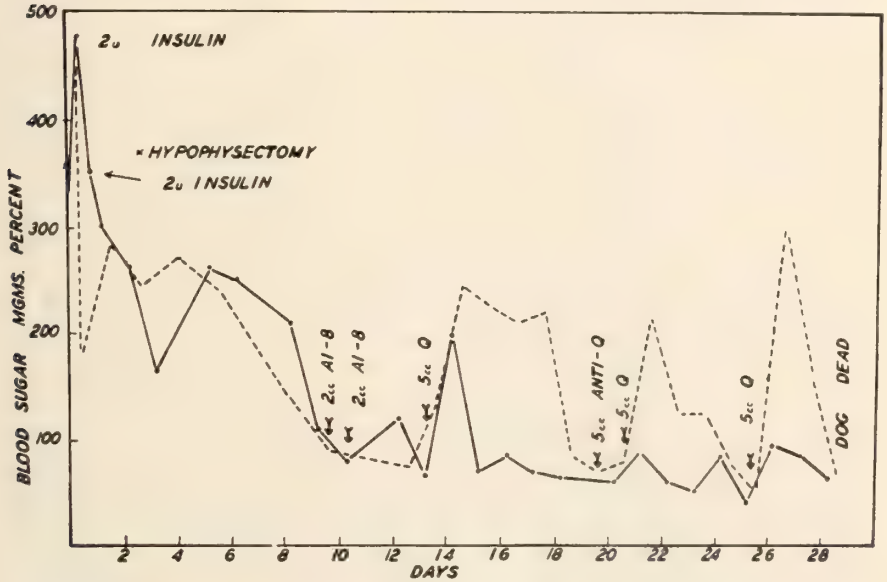


CHART 21. Dotted line—evening blood sugars. Solid line—morning blood sugars of a Houssay dog. Adrenotropic extract A.I., growth extract Q and anti-Q (horse serum) were administered. Shows suggestive evidence of a neutralizing of the diabetogenic effect of Q extract by the anti-Q horse serum.

ple or whether it is a side effect of one of the known pituitary hormones. Since our Q extract has been found to be diabetogenic, it was of interest to see if any antidiabetogenic effect could be demonstrated in the serum of the horse chronically injected with Q extract. Due to the fact that normal animals are useless in this type of testing, we have confined our efforts to the Houssay dog. Here again there is great difficulty because the average Houssay animal has a blood sugar of 250 mgm. and excretes large amounts of sugar. One animal which had been treated for some weeks with oestrogenic extracts of placenta and pregnancy urine prior to

the Houssay operation of pancreatectomy and hypophysectomy did have a fasting blood sugar of less than 100 mgm. This animal was treated with the Q extract and the antigrowth serum taken from hypophysectomized rats as indicated in the chart. The results are very suggestive of a neutralization of the diabetogenic action of the Q extract by the anti-Q serum. They are not conclusive, however, but they have encouraged us to extend the research along these same lines.

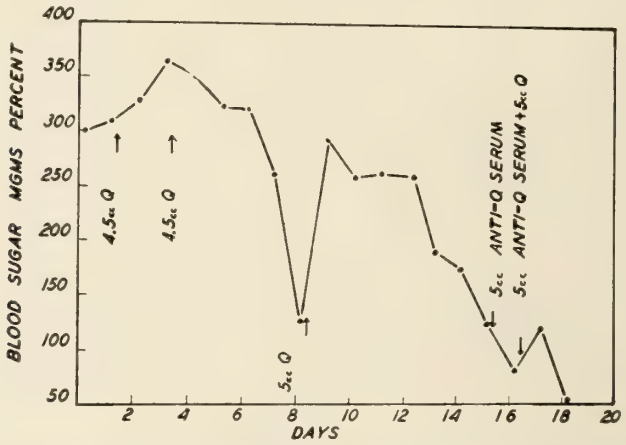


Chart 22. Houssay dog—morning blood sugars. Q extract, diabetogenic and anti-Q serum administered as shown on chart. Like no. 21, shows suggestive evidence of a neutralizing of the diabetogenic effect of Q extract by the anti-Q serum.

ANTI-KETOGENIC PRINCIPLE

Using what is no doubt altogether too artificial a test object—normal rats on a butter diet (Burn and Ling)—Mr. Peter Black has found that animals which have become non-responsive to the thyreotropic hormone do not give a positive result by the Burn-Ling test for acetone body excretion. Also he has decreased the ketogenic effect of the thyreotropic extract on normal animals by injecting them with antithyreotropic serum. These results, while not free of criticism, nevertheless suggest the interesting possibility that the diabetogenic effect (hyperglycaemia and glycosuria) and the ketogenic effect (increased excretion of acetone bodies) may be mediated through two entirely different mechanisms (charts 17, 18, 19).

THE ANTI-ADRENOTROPIC SUBSTANCE

We have as yet no experimental evidence to submit which would establish the existence of such a principle, although we confidently believe that such exists.

CLINICAL APPLICATIONS

Hormone therapy of any kind must be approached with much greater caution than has been the case in the past. While the results of our recent work suggest that many new dangers may attend the clinical use of glandular extracts, they also point the way to new applications. If the general principles established by the animal work are applicable to the human subject, then one must consider the possibility both of creating antihormones in an active way in the system of the patient, and of increasing the antihormone level by use of active extracts of the serum of horses or other animals which have been treated for long periods with the respective hormone.

I should like to point out, in bringing this discussion to a close, that some of the statements which I have made represent final conclusions which I trust will stand the test of time; some on the other hand are the expression of a point of view in keeping with the results of experiments made; and finally, some are purely speculative. The part of the work of which I have spoken that has been carried out in the Biochemistry Department of McGill University has been due to the splendid cooperation of a relatively large group of workers to whom all credit must be given for such positive findings as have been made.

The members of this team are Drs. E. M. Anderson, C. Bachman, R. L. Kutz, C. S. McEuen, H. Mortimer, L. I. Pugsley, H. Selye and D. L. Thomson; Miss Margaret Hill; and Messrs. P. T. Black, O. Denstedt and T. McKeown.

REFERENCES

(1) Quoted by Aschner, B.: Physiologie der Hypophyse, in Hirsch's Handbuch der Inneren Sekretion, Vol. 2, Part 1, p. 277.
(2) Quoted by Aschner, B.: Physiologie der Hypophyse, in Hirsch's Handbuch der Inneren Sekretion, Vol. 2, Part 1, p. 277.
(3) Horsley, V.: Lancet *1:* 5, 1896.
(4) Vassale and Sacchi: Riv. sperim di Freniatr., *20:* 83, 1894; *18:* 525, 1892.
(5) Biedl, A.: Wiener klin. Wschr., *1897:* 195.
(6) Collip, J. B., Selye, H., and Thomson, D. L.: Nature, *131:* 56, 1933.
(7) Collip, J. B., Selye, H., and Thomson, D. L.: Virchows Arch., *290:* 23, 1933.
(8) Collip, J. B., Selye, H., and Thomson, D. L.: Proc. Soc. Exper. Biol. Med., *30:* 544, 1933.
(9) Anderson, E. M., and Collip, J. B.: Proc. Soc. Exper. Biol. Med., *30:* 680, 1933.
(10) Collip, J. B., Anderson, E. M., and Thomson, D. L.: Lancet, 1933, p. 347.
(11) Selye, H., Collip, J. B., and Thomson, D. L.: Endocrinol., *17:* 494, 1933.
(12) Selye, H., Collip, J. B., and Thomson, D. L.: Proc. Soc. Exper. Biol. Med., *31:* 264, 1933.
(13) Selye, H., and Collip, J. B.: Proc. Soc. Exper. Biol. Med., *30:* 647, 1933.
(14) Selye, H., Collip, J. B., and Thomson, D. L.: Proc. Soc. Exper. Biol. Med., *30:* 780, 1933.
(15) Collip, J. B., Selye, H., and Thomson, D. L.: Proc. Soc. Exper. Biol. Med., *30:* 665, 1933.

(16) Collip, J. B., Selye, H., Thomson, D. L., and Williamson, J. E.: Proc. Soc. Exper. Biol. Med., *30:* 590, 1933.
(17) Selye, H., Collip, J. B., and Thomson, D. L.: Proc. Soc. Exper. Biol. Med., *30:* 588, 1933.
(18) Wallen-Lawrence, Z., and Van Dyke, H. B.: J. Pharmacol., *43:* 93, 1931.
(19) Van Dyke, H. B., and Wallen-Lawrence, Z.: J. Pharmacol., *45:* 277, 1932.
(20) Van Dyke, H. B., and Wallen-Lawrence, Z.: J. Pharmacol., *47:* 163, 1933.
(21) Evans, H. M., Meyer, K., and Simpson, M. E.: Memoirs of the Univ. of California, *11:* 1933.
(22) Hisaw, F. L., Fevold, H. L., and Leonard, S. L.: Proc. Soc. Exper. Biol. Med., *29:* 204, 1931.
(23) Fevold, H. L., Hisaw, F. L., and Leonard, S. L.: Amer. J. Physiol., *97:* 291, 1931.
(24) Claus, P. E.: Physiol. Zool., *4:* 36, 1931.
(25) Wiesner, B. P., and Crew, F. A. E.: Proc. Roy. Soc. Edinburgh, *50:* 79, 1930.
(26) Agnoli, R. T.: Boll. Soc. Ital. Biol. Sperim., *6:* 754, 1931.
(27) Selye, H., Collip, J. B., and Thomson, D. L.: Proc. Soc. Exper. Biol. Med., *30:* 589, 1933.
(28) Selye, H., Collip, J. B., and Thomson, D. L.: Proc. Soc. Exper. Biol. Med., *31:* 82, 1933.
(29) Pencharz, R. I., and Long, J. A.: Science, *74:* 206, 1931.
(30) Selye, H.: Proc. Soc. Exper. Biol. Med., *31:* 488, 1934.
(31) Loeb, L.: Proc. Soc. Exper. Biol. Med., *20:* 441, 1923.
(32) Selye, H., Collip, J. B., and Thomson, D. L.: Proc. Soc. Exper. Biol. Med., *31:* 82, 1933.
(33) Riddle, O., Bates, R. W., and Dykshorn, S.: Amer. J. Physiol., *105:* 191, 1933.
(34) Gardner, W. U., and Turner, C. W.: Mo. Agric. Exp. Sta. Bull. *196:* 1933.
(35) Collip, J. B., Selye, H., and Thomson, D. L.: Proc. Soc. Exper. Biol. Med., *30:* 913, 1933.
(36) Selye, H., Collip, J. B., and Thomson, D. L.: Endocrinol., *18:* 237, 1934.
(37) Selye, H.: Amer. J. Physiol., *107:* 535, 1934.
(38) Selye, H., and McKeown, T.: Proc. Soc. Exper. Biol. Med., *31:* 683, 1934.
(39) Selye, H.: Proc. Soc. Exper. Biol. Med., *31:* 262, 1933.
(40) Collip, J. B., Selye, H., Anderson, E. M., and Thomson, D. L.: J. Amer. Med. Assoc., *101:* 1553, 1933.
(41) Cushing, H.: The Pituitary Body and Its Disorders, J. B. Lippincott Co., Philadelphia, 1912.
(42) Allen, B. M.: Science, *52:* 274, 1920.
(43) Smith, P. E.: J. Amer. Med. Assoc., *88:* 158, 1927.
(44) Graubner, W.: Zeitschr. klin. Med., *101:* 249, 1925.
(45) Loeb, L., and Bassett, R. B.: Proc. Soc. Exper. Biol. Med., *26:* 860, 1929.
(46) Aron, M.: C. r. Soc. Biol., *105:* 581, 1930.
(47) Aron, M.: C. r. Soc. Biol., *105:* 585, 1930.
(48) Janssen, S., and Loeser, A.: Arch. f. exp. Path. & Pharm., *163:* 517, 1931–2,
(49) Krogh, M., et al: Acta Path. et Microbiol. Scand., *9:* 37, 1932.
(50) Grab, W.: Naunyn-Schmiedebergs Arch., *167:* 313, 1932.
(51) Schittenhelm, A., and Eisler, B.: Klin. Wschr., *11:* 1092, 1932.
(52) Houssay, B. A., Biassotti, A., and Magdalena, A.: Riv. Soc. Arg. Biol., *8:* 130, 1932.
(53) Baumann, E. G., and Marine, D.: Proc. Soc. Exper. Biol. Med., *29:* 1220, 1932.
(54) Riddle, O., and Polhemus, T.: Amer. J. Physiol., *98:* 121, 1931.
(55) Schockaert, J. A.: Amer. J. Anat., *49:* 379, 1932.

(56) Anderson, E. M.: Canad. Med. Assoc. J., *28:* 23, 1933.
(57) Siebert, W. G., and Smith, R. S.: Amer. J. Physiol., *95:* 369, 1930.
(58) Loeser, A.: Naunyn Schmiedebergs Arch., *163:* 530, 1931–32.
(59) Junkmann, K., and Schoeller, W.: Klin. Wschr., *11:* 1176, 1932.
(60) Verzar, F., and Wahl, V.: Biochem. Ztschr., *240:* 37, 1931.
(61) Loeb, L., and Friedmann, H.: Proc. Soc. Exper. Biol. Med., *29:* 648, 1932.
(62) Schockaert, J. A., and Foster, G. L.: J. Biol. Chem., *95:* 89, 1932.
(63) Closs, K., et al.: J. Biol. Chem., *96:* 585, 1932.
(64) Grab, W.: Naunyn-Schmiedebergs Arch. *167:* 413, 1932.
(65) Eitel, W., and Loeser, A.: Naunyn-Schmiedebergs Arch. *167:* 381, 1932.
(66) Eitel, W., Löhr, G., and Loeser, A.: Ibid., *173:* 205, 1933.
(67) Pugsley, L. I.: Amer. J. Physiol., 1934, in press.
(68) Pugsley, L. I.: J. Biol. Chem., *100:* (Proceedings), p. lxxxi, 1933.
(69) Smith, P. E.: Anat. Rec., *47:* 119, 1930.
(70) Richter, C. P., and Wislocki, G. B.: Amer. J. Physiol., *95:* 481, 1930.
(71) Koster, S.: Pflügers Arch., *224:* 212, 1930.
(72) Sakamoto, A., and Saito, G.: Z. exp. Med., *80:* 601, 1932.
(73) Kapran, S.: Zeit. med. Ciklu., *2:* 501, 1932.
(74) Burn, J. H., and Ling, H. W.: J. Physiol., *69:* xix, 1930.
(75) Hoffmann, F., and Anselmino, K.: Klin. Wschr., *1931:* 2383.
(76) Anselmino, K., and Hoffmann, F.: Klin. Wschr., *1931:* 2380.
(77) Funk, Z., and Zefirow, P. P.: 14th Internat. Congr. of Physiol., *89:* 1932.
(78) Magistris, H.: Rev. Soc. Arg. Biol., *8:* 297, 1932.
(79) Magistris, H.: Endokrinologie, *11:* 176, 1932.
(80) Rietti, C. T.: J. Physiol., *77:* 92, 1932.
(81) Evans, et al.: Memoirs of Univ. of California, *11:* 1933.
(82) Houssay, et al.: C. r. Soc. Biol., *112:* 497, 1933.
(83) (a) Collip, J. B., and Anderson, E. M.: Lancet, 1934, p. 76.
(b) Anderson, E. M., and Collip, J. B.: Lancet, 1934 April, 14.
(84) Trabiucchi, E.: Boll. Soc. Ital. Biol. Sper., *7:* 930, 1932.
(85) Fremery, P. de, et al.: Pflügers Arch., *231:* 341, 1932.
(86) Cushny, A. R.: J. Pharm. exp. Therap., *6:* 439, 1915.
(87) Clark, A. J.: J. Physiol., *61:* 547, 1926.
(88) Gaddum, J. H.: J. Physiol., *61:* 141, 1926.
(89) McEuen, C. S., and Thomson, D. L.: Brit. J. Exp. Path., *14:* 384, 1933.
(90) Meyer, A. E., and Fevold, H. L.: Proc. Soc. Exp. Biol. Med., *31:* 570, 1934.
(91) Aub, Bauer, Heath and Ropes: J. Clin. Investigation, *7:* 97, 1929.
(92) Marine, D., and Rosen: Am. J. Physiol., *107:* 677, 1934.
(93) Smith, P. E., Greenwood, C. F., and Foster, E. L.: Am. J. Pathol., *3:* 669.

ABSTRACTS[1]

Gall bladder and liver diseases. Emanuel Libman. Proceedings of the Interstate Post Graduate Medicinal Assembly, for 1932, pages 340–346, published in 1933.

In the course of a clinical demonstration there is first discussed pain, with special reference to gall bladder disease. Other subjects taken up are cardiac disturbances due to gall bladder disease, "gouty disturbances" (especially cervical spondylitis), the appraisal of the size of the liver, the question of visceral sensitiveness, and a hypothesis made to explain a number of common diseases.

Bacterial endocarditis. Emanuel Libman (Charles Friedberg). Cyclopedia of Medicine (Davis, Philadelphia), Vol. III, p. 181, 1933.

The writers give a summary of our present knowledge of subacute bacterial endocarditis, covering the etiology, pathology, clinical picture and course of the disease. The bacteria free stage is rather fully described. A brief account of acute bacterial endocarditis is added, and also references to much of the important literature.

Affections of the coronary arteries. Emanuel Libman. Proceedings of the Interstate Post Graduate Medicinal Assembly for 1932, pp. 405–410, published in 1933.

Cardiovascular thoracic pains of various origins are discussed, with particular reference to cases of nerve origin, or due to coronary artery atherosclerosis, or thrombosis. The diagnostic criteria of ventricular aneurysm are given. There follow ideas on pathogenesis. A plea is made for a study of the metabolic origin of many of the cases, including the question of thrombophilia, and a plan for prophylaxis.

Prevention of chills following the transfusion of citrated blood. Richard Lewisohn and Nathan Rosenthal. Journal of the American Medical Association, 100, 466, February 1933.

The authors discuss in detail the preparation of instruments and solutions used in the transfusion of citrated blood. They present the following conclusions:

1. Post-transfusion chills are avoidable.
2. Chills are not due to the mixture of the blood with sodium citrate.
3. Elimination of the foreign protein elements, detailed instructions for which have been given, will reduce the number of chills to a minimum.
4. The use of solutions (sodium citrate and physiologic solution of sodium chloride) prepared with triple distilled water is indispensable.
5. The incidence of chills following citrate transfusions has been reduced from 12 per cent to 1 per cent.
6. If instruments and solutions are prepared properly, citrate transfusion can be used with safety in every case requiring a blood transfusion.

[1] Authors' abstracts of papers published elsewhere by members of the Mount Sinai Hospital staff.

VOLUME 1 JULY–AUGUST, 1934 NUMBER 2

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

CASE OF AMOEBIC ABSCESS OF THE LIVER WHICH PERFORATED INTO THE GENERAL ABDOMINAL CAVITY; OPERATION AND RECOVERY

A. O. WILENSKY, M.D.

[*Service of Dr. Lewisohn*]

CASE REPORT

History (H. N. 362113). A 39 year old man was admitted to the hospital on March 18, 1934, complaining of pain in the upper part of his abdomen.

The patient was a chauffeur; he was born in Poland and has lived in New York City for the past 18 years; he has never been in the tropics. The family history contributes no facts bearing upon his present illness. The past history is also negative, except for an occasional cough productive of a small amount of greenish white mucoid sputum, unassociated with pain in the chest.

The present illness began two weeks before admission to the hospital when the patient first noted a mild epigastric pain which was not related to the intake of food and which was definitely aggravated by flexion of the trunk. The pain persisted. Anorexia and constipation were present but there was no nausea or vomiting. There was no melena. Three days after the onset the patient noted a hard, tender bulge in the mid-epigastrium which has persisted without change in size up to the present time. On two occasions the pain increased in severity and then diminished (there is no history of any trauma to the abdominal wall).

Examination. Physical examination at the time of admission showed a well developed, well nourished white male, apparently not severely ill. The temperature was 100.6°F., the pulse was 90, the respirations 20 to the

minute. The blood pressure was 120/80 mm. Hg. The abdominal wall was tender and incompletely relaxed. A vague oval mass about 3 inches wide and 2 inches long was indefinitely palpable, lying transversely in the mid-epigastrium. It was slightly irregular and transmitted an impulse on coughing. The mass was dull to percussion and it appeared to bulge more prominently on straining and when the patient bent forward. The bulge could not be reduced into the abdominal cavity.



FIG. 1. Roentgenogram, illustrating filling defect in the antrum

Course. On the day following admission to the hospital the temperature receded to 99.6°. The pain continued. The white blood count was 12,400; the differential count showed polynuclears, 68 per cent; lymphocytes, 24 per cent; mononuclear cells, 6 per cent; eosinophiles, 2 per cent. The sedimentation time was 25 minutes.

Under the impression that we were dealing with an epigastric hernia containing incarcerated omentum, the patient was taken to the operating

room on the following day, where after the administration of morphine and a general anesthetic, and after some degree of abdominal relaxation had occurred, the mass in the upper abdomen was felt very clearly to be hard and irregular and to arise from the intraabdominal cavity. The operation was therefore postponed to allow for further investigation. A gastro-intestinal X-ray series revealed a filling defect in the antrum of the stomach fluoroscopically and in the films (fig. 1). There was no delay in gastric emptying. The whole appearance suggested a malignant tumor of the antrum of the stomach. Chemical test did not show the presence of blood in the stool. Aspiration of the stomach showed no gastric retention, and the total acidity was 56 (free acidity 34).

The impression at this time was that the patient had a carcinoma of the stomach which had penetrated the gastric wall. The patient was observed further. During the succeeding week, there was not much change; but by the end of that time the temperature, which had been gradually rising, reached a level of 102.4°F. The same evening the mass in the epigastrium seemed definitely larger and the next day it seemed still larger. The pain seemed somewhat intensified also. It was therefore decided to operate upon the man on the following day.

At about 4:30 o'clock the same afternoon, however, the patient began to complain of severe epigastric pain; the pain spread all over the right side of the abdomen and increased in severity; and presently the patient was covered with a profuse clammy sweat. Very soon after the onset of the pain—within half an hour, to be exact—my attention was called to the sudden change in the patient's condition.

The man was in collapse; the abdomen generally had a board-like rigidity, and there was tenderness and rebound tenderness all over its right side. The left side of the abdomen seemed less affected than the right. There was no obliteration of the liver dullness. The epigastric mass had not changed to any appreciable extent.

It was thought that either the carcinoma had suddenly perforated or that a perigastric abscess resulting from the carcinoma had suddenly perforated. The patient was therefore taken to the operating room immediately, the length of time between the onset of the acute symptoms and the operation being approximately one hour.

A vertical incision was made in the mid-epigastrium. The layers of the abdominal wall were considerably infiltrated but with comparatively little difficulty an opening was made through the peritoneum at the upper angle of the incision where the tissues were not adherent. Below this area the liver was adherent to the abdominal wall and on carefully separating this area an abscess cavity was entered into. The entrance to the abscess passed directly through the anterior wall and into the thickness of the left lobe of the liver. The roof of the abscess cavity apparently consisted of liver tissue especially over towards the left side. The lateral bound-

aries of the abscess cavity could not be reached with the palpating finger. The floor of the abscess cavity apparently consisted of stomach and intestinal loops, and the impression was that the abscess lay either partially or wholly within the lesser peritoneal sac. A large amount of thick, grumous, blood stained pus containing numerous clots was evacuated from the abscess, and drainage was instituted with a large rubber tube and with several packings. The abdominal incision was partially closed in layers up to the point of emergence of the drainage apparatus.

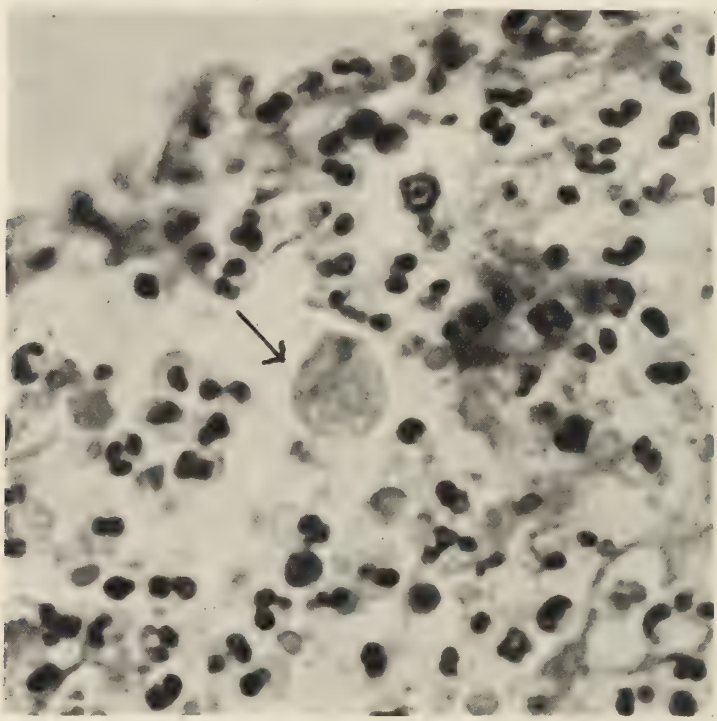


FIG. 2. Section of liver abscess material; arrow points to an amoeba

An abdominal puncture was then done in the right lower quadrant and pus similar in all respects to that contained in the mid-epigastric abscess was obtained. A right lower rectus incision was made and a large quantity of pus evacuated from both the pelvis and right lumbar gutter. A large tube was placed in the pelvis and a second tube was placed in the lumbar gutter for drainage. The abdominal incision was partially closed around the drainage tubes.

The pus obtained from the upper abdominal wound at operation was sterile in aerobic and anaerobic cultures. Blood chemistry showed frequent cholesterol 170 mgm. per cent. The pus from the right lower

quadrant wound contained B. alkaligenes. The pathological report of a specimen of liver tissue removed at operation was "fragment of fibrous wall of liver abscess—no bacteria found."

The postoperative course was remarkably smooth. The temperature rapidly subsided and ranged between 100° and 101°. On the fifth postoperative day the upper wound drained bile-stained material bearing out my impression that we were dealing with an intra-hepatic abscess. Fleshy, grumous pus continued to discharge from the upper wound profusely;



FIG. 3. Roentgenogram showing disappearance of filling defect (see fig. 1)

the lower wound discharged for only 9 days and then proceeded to heal rapidly. Fresh smears from the discharge of the upper wound showed no amoebae on several examinations. On the 17th postoperative day, because the exudate from the upper wound appeared so typical of liver abscess material, a specimen was sent to the laboratory for examination and amoebae were found in stained sections (fig. 2).

At the present time, the lower wound is completely healed. There is a small shallow upper wound, the discharge from which is now purulent, and no longer grumous. The patient looks and feels well and he is re-

ceiving an 11 day course of emetine hydrochloride injections intramuscularly. The gastro-intestinal X-ray studies were repeated, and at this time no abnormality was noted in the stomach, (fig. 3), indicating that the filling defect previously observed was an artifact due to pressure of the large liver abscess.

DISCUSSION

Amoebic infection is the most common cause for solitary abscess of the liver. Other causes for various types of liver abscesses are: dysentery bacilli; trauma; typhoid infection in which the abscess has some relation to the focal necroses. According to Tedenat, abscesses occur very rarely after influenza. Secondary infections occur in hydatid cysts, gummata, tuberculomata, with primary infections by actinomyces, and as metastatic infections through the hepatic artery. An uncommon abscess of the liver occurs as an extension from an infected gall bladder or from an infiltrating carcinoma of the stomach.

Amoebic abscesses of the liver occur, in the main, in tropical countries in which, however, the distribution is not uniform. Europeans who reside in the tropics are said to be more predisposed, and males seem to be affected more often than females.

Anatomically from 60 to 80 per cent of the abscesses occur in the right lobe of the liver. Occasionally both lobes are involved. A single abscess occurs in 70 per cent of the cases and these sometimes reach proportions large enough to accommodate 8 to 9 quarts of fluid. About 85 per cent of the unopened abscesses are bacteria-free; nevertheless contamination is common. It is rare to find an abscess in a cirrhotic liver.

From the point of view of amoebic abscesses of the liver which occur sporadically in temperate countries, the story elicited from the patient should include: a history of tropical habitat; an episode of some form of dysentery; or exposure to infection during an epidemic or from a carrier. The main local symptoms include: fever, pain, enlargement of the liver and leukocytosis. Amoebae can be frequently found in the stools.

In the differential diagnosis one must exclude lues, hydatid disease, trypanosomiasis, endocarditis, typhoid fever, kala-azar, malta fever, and bacillary dysentery.

The treatment of amoebic abscesses of the liver combines the use of emetin and operation. The results are about as follows:

(1) With repeated aspiration of the liver plus emetin, the mortality is about 19 per cent according to Thurston, and about 14 per cent according to Rogers. This method of treatment is only good when the abscess is not secondarily affected.

(2) Open operation alone is followed by a mortality of 57 per cent according to Rogers who reported an experience of 2261 cases.

(3) Hartman, Keppel and Hudson recommend the use of emetin alone and Fraucon and Hutinel recommend the use of emetin plus salvarsan.

The following points are of particular interest.

(1) The source of this infection has not been definitely established up to the present time. The only possible source we can find relates to a man who is living in the same house, with whom, however, the patient had no contact of any kind, and who was in Chicago last summer during the epidemic. The patient gives no history of any dysentery and has never had any diarrhea of any kind as long as he remembers.

(2) The question of diagnosis: two preliminary errors in diagnosis were made. The first diagnosis made upon the patient's admission to the hospital, was the assumption that the bulge in the epigastrium was an incarcerated and inflamed epigastric hernia. The second diagnosis was made at the time of the first X-ray examination when the defect found in the stomach roentgenographically was interpreted as a carcinoma. The second X-ray study proves, of course, that the original defect was an artifact, and was due to pressure upon the stomach of the large amoebic abscess.

(3) The occurrence of the rupture of the abscess into the free peritoneal cavity. The causes of death in abscess of the liver include: sepsis, exhaustion, or the occurrence of some complications, especially rupture. This man owes his life to the promptness with which it was possible to operate upon him after the rupture occurred.

Abscess of the liver may rupture into various structures.

(a) Into the lung, in 44 per cent of the cases reported. The right lung is most often affected, and a broncho-pulmonary fistula may follow. Abscesses of the lung sometime occur independently of the perforation and amoebae have been found in branches of the pulmonary artery. According to Nanson from 50 to 75 per cent of the cases recover.

(b) Into the pleural cavity, in 11 per cent of the cases.

(c) Into the peritoneal cavity, in 18 per cent of the cases and the accident may be precipitated by an injury.

(d) Into the intestines, in 13 per cent of the cases—most commonly into the duodenum.

(e) Into the stomach, in 21 per cent of the cases.

(f) Into the pericardial sac, in 1 per cent of the cases.

(g) Externally, in 6 per cent of the cases.

(h) Into the thin walled hepatic veins, more commonly than into the portal radicles.

Embolism and secondary abscesses of the lung are prone to occur. Secondary brain abscesses are very rare. Amoebae have been found only in some of these cases. Thrombosis of the inferior vena cava is also rare. Secondary small abscesses in the neighborhood of the main abscess which previously had been common, occur rarely now because of the emetin treatment.

SUBACUTE ENTEROCOCCUS ENDOCARDITIS[1]

KAUFMAN WALLACH, M.D

[*Service of Dr. B. S. Oppenheimer*]

Subacute enterococcus endocarditis is a rare form of endocardial disease. This case merits presentation, because the development of the valvular lesion was observed throughout the course of its evolution, and its character was verified by bacteriologic and postmortem studies.

CASE REPORT

History (H. N. 347226). A white housewife, aged 36 years, born in the United States, was first admitted to the Hospital April 20, 1932. Her chief complaints on admission were pain in the left loin for 2½ months and fever for fifteen days. Her past history was essentially negative.

About 5 months before admission, she had had an abortion induced by a midwife. One month later there appeared elevation of temperature, generalized body aches, and slight chills over a period of two weeks, leaving her with a feeling of weakness. This was followed by attacks of intermittent pains in the left lower abdominal quadrant. They were unaccompanied by urinary symptoms, but her physician found on one occasion pus and red blood cells in the urine. She then began to cough producing little expectoration. Fifteen days before admission she was seized with a severe shaking chill. It was accompanied by a rise in temperature which continued irregular, reaching at times as high as 104° in the afternoon. On the day before admission, she noted a small, tender, elevated red spot on the inner aspect of her left elbow. Since the onset of her illness, 4 months ago, she had lost 20 pounds in weight.

Physical examination. The patient was a well developed and well nourished woman, not acutely ill in appearance. Her temperature was 104° and the pulse rate 100. There were no petechiae in the conjunctivae, fundi or mucus membranes. The heart was completely negative. The lungs were clear. The liver edge was just palpable. The spleen could be felt two fingers' breadth below the costal margin; it was firm, had a sharp edge, but not tender. There was an erythematous nodule, the size of a hazel nut, on the inner aspect of the upper left forearm. There was no clubbing of fingers. The pelvic examination was negative.

Laboratory findings. The blood pressure was 132 systolic and 80 di-

[1] Presented before the clinical pathological conference of Mount Sinai Hospital, February 1, 1933.

astolic. Hemoglobin, 63 per cent, red blood cells, 3,600,000, white blood cells, 4100, polymorphonuclear neutrophils, 83 per cent, lymphocytes, 12 per cent, large mononuclears, 4 per cent, and basophiles, 1 per cent. The sedimentation rate was 40 minutes. Examination of the urine showed an occasional white blood cell. An electrocardiogram showed left axis deviation.

Course. The impression was that the patient was suffering from some low grade sepsis, either in the nature of a pelvic phlebitis or a bacteremia brought on by the induced abortion. A blood culture taken on the day of admission revealed a gram positive coccus, 25 colonies per cubic centimeter. This was only later identified as enterococcus. Repeated blood cultures taken during her entire course in the hospital always yielded the identical organism.

The patient remained in the hospital for a period of $3\frac{1}{2}$ months without showing any change in her general condition. Her temperature ran a typically septic course with daily fluctuations from 99° in the morning to 102° in the afternoon, rising occasionally as high as 105°. There were infrequent chills. The pulse varied between 88 and 120. She frequently complained of pain in the left subcostal region, which was thought to be splenic in origin, since repeated urine examinations failed to reveal any evidence of renal disease. On April 29, the ninth day in the hospital, a systolic murmur at the apex was noted for the first time. The murmur remained practically unchanged throughout her first stay in the hospital. At different times she displayed showers of peculiar skin lesions. These were usually situated on the extremities, especially the legs, occasionally on the upper part of the chest. They were preceded by a pruritic sensation at the point of origin and were in the nature of a papular erythematous eruption. At first the skin lesions were millet seed in size but gradually enlarged. When fully developed they would assume the character of a small indurated papule, surrounded by a growing areola of erythema which would fade on pressure. As a rule, the individual lesions would gradually disappear within 48 hours. In the meantime, the hemoglobin slowly fell to 53 per cent, with no significant changes in the white blood cell count. Repeated urine cultures were positive for enterococcus.

The development of a cardiac murmur, the embolic lesions, possible splenic infarctions and the anemia now led to the diagnosis of bacterial endocarditis. Sigmoidoscopy, cystoscopy, pyelograms, and numerous pelvic examinations failed to disclose the source of infection.

She received at various times Bargen's streptococcus serum, transfusions, and intravenous infusions of phenyl mercuric nitrate with no apparent effect on the course of the disease. During the latter part of her residence in the hospital she was up and about, and at her request was allowed to return home on August 4, 1932.

Two months later she was readmitted to the hospital with generalized

joint pains added to her previous symptoms. Her general appearance had not changed. However, there was now heard a loud rough systolic murmur, which extended over the whole precordial area, and the first apical and second pulmonic sounds were accentuated. Urine examinations now showed albumen 2 plus, numerous hyaline and granular casts and white and red blood cells. As on her previous admission the temperature ranged between 99° and 104°. On one occasion a splinter hemorrhage was noted beneath the right middle finger nail. After a month's stay in the hospital, she was again discharged with little change.

She was admitted for the third time December 28, 1932, because of persistent swelling of the legs and ankles. She was now pale, thin and somewhat dyspneic. She presented all the signs of mitral stenosis as well as those of insufficiency. Frequently there were extrasystoles. There was pitting edema of the legs and ankles. The hemoglobin had fallen to 32 per cent. A blood culture showed again enterococcus with 150 colonies per cubic centimeter. The temperature curve was like that noted on her previous admissions. Crops of petechial hemorrhages developed from time to time on the trunk, and in the mucus membranes of the mouth, some of them presenting white centers. The urine at times was frankly hemorrhagic. A neurologic examination disclosed loss of vibratory and position sense, which may have been a manifestation of the severe anemia. Despite administration of diuretics the signs of myocardial failure increased. The edema of her extremities increased; the liver became progressively larger and congestion at both bases of the lungs developed. Terminal issue occurred on January 14, 1933, nine months after first admission to the hospital.

Necropsy findings. The results of the post-mortem studies were summarized as follows:

1. Subacute bacterial endocarditis (enterococcus) with healed lesions of the tricuspid, pulmonic, aortic and mitral valves with fresh vegetations of the mitral valve, mural endocarditis (left auricle and ventricle).
2. Old and recent infarcts of the spleen and kidneys.
3. A mycotic aneurysm of the coronary artery.
4. Severe myocardial degeneration.
5. Splenomegaly.
6. Massive focal glomerulonephritis.
7. Severe chronic passive congestion of the lungs and liver.
8. Anasarca.
9. Subacute pelvic peritonitis.
10. Healed thrombosis of varicose veins of the broad ligament.

The fresh vegetations on the mitral valve formed a huge reddish gray plaque, beginning at the line of closure of the anterior cusp and sweeping over the whole auricular surface of the valve, on to the posterior auricular endocardium. Similar vegetations hung down into the ventricle covering the chordae and attached to the papillary muscles. Microscopically the heart muscles showed small areas of hemorrhage and diffuse infiltration with polymorphonuclear cells. There were small

circumscribed abscesses containing masses of gram positive cocci. The spleen showed infected infarcts with gram positive cocci within and about the abscesses.

COMMENT

The enterococcus is a common saphrophytic inhabitant of the human gastro-intestinal tract. It often invades the genito-urinary tract, especially in the female. It may be found in the upper respiratory tract. Here too, it is usually found as a saphrophyte. However, it may assume a pathogenic rôle in any of these situations. Acute and chronic inflammations are frequently ascribed to the enterococcus. It is regarded often as the causative agent of appendicitis, cholecystitis, ulcerative colitis, pyelitis, peritonitis, puerperal infections and otitis media. The rarer instances of enterococcemia and enterococcus endocarditis are occasionally traced to these sources of infection. In this case the portal of entry, suspected clinically, was proven by the anatomical data. The initial symptoms followed shortly after an abortion and, at necropsy, there were found pelvic peritonitis and a healed primary focus in a wide spread thrombosis of the pelvic veins. Although the features in the main are similar to those found in subacute bacterial endocarditis, some in particular should be noted. One of these was the papular erythematous eruption which bore a striking resemblance to that seen in another case of enterococcemia previously observed in this hospital (H. N. 315743). The tendency to infected infarcts and the extensive infiltration of the heart muscle is infrequent in subacute endocarditis. Termination with myocardial failure, as in this case, is relatively infrequent in subacute endocarditis caused by streptococcus viridans. The explanation for it here may lie in the diffuse myocardial disease as shown in microscopic studies in this case.

Morphologically the enterococcus is indistinguishable from other non-hemolytic, non-pigment producing Gram-positive cocci. It may easily be confused with such organisms as a short chained non-hemolytic streptococcus or a Staphylococcus albus. Only after further cultural investigation could its identity as an enterococcus be established. The characteristics which readily serve to differentiate it are: the ability of the enterococcus to ferment aesculin and to grow in 20 per cent bile media as well as its resistance to heat.

With these clinical and pathological features in mind and a knowledge of the cultural characteristics of the organism, the diagnosis of enterococcemia and enterococcus endocarditis may be made more frequently.

REFERENCES

(1) Aschoff, L.: Ueber den Enterokokkus (Streptococcus Libman). Libman Anniversary Volumes, Ed. 1, New York, The International Press, 1932, I: 87.

(2) Rosenberg, G.: Zur Kenntnis der Enterokokken-Endokarditiden. Klin. Wchnschr., 1: 359, 1932.

ADHESIVE SPINAL ARACHNOIDITIS WITH MARKED IMPROVEMENT FOLLOWING LAMINECTOMY AND RADIOTHERAPY

HERMAN SELINSKY, M.D.

[*Neurological Service of Dr. Israel Strauss*]

History (H. N. 360356). A white woman 28 years old, lunch room worker, entered the neurological service complaining of stiffness and weakness of both lower extremities. At the age of 20, she married and about that time developed a "fever" with a purulent discharge from the left ear which persisted. A year later she had an uncomplicated miscarriage. Thereafter she appeared to be fairly well up until $3\frac{1}{2}$ years ago, at which time she consulted a gynecologist for sterility. A dilatation and curettage was performed and a uterine polyp removed under spinal anesthesia. Following the operation, her temperature rose and she complained of headache for two days. A few days later there developed dizziness and some abdominal pain. The headache was exacerbated at the menses and, when severe, was accompanied by temporary visual impairment. About this time, the patient noticed progressive loss of hearing. In April 1932, she was admitted to the Gorgas Hospital in Panama. There she was found to be undernourished and running an irregular temperature ranging between 98° and 102°. The heart and lungs were normal. The abdomen was distended and small, ballotable tumor masses were palpable, probably fecal. The pupils reacted to light and accommodation. The knee jerks and biceps jerks were said to be normal and the plantar responses were flexor. X-ray examination of the mastoids showed a deficient pneumatization on both sides. The blood picture showed 70 per cent hemoglobin, 3,650,000 red blood cells, from 7000 to 10,000 of white blood cells and eosinophilia. Repeated smears of the blood for malaria were negative. The spinal fluid sugar ranged from 31 to 47 mgm. The spinal fluid at that time was noted as being turbid with 1840 cells per cubic millimeter, but the cells were so degenerated that a differential count was impossible. No organisms were found either on smear or culture. Blood and spinal fluid Wassermann tests were negative; the colloidal gold reaction presented a suggestive meningitic curve. On otologic examination a chronic suppurative otitis media was diagnosed. Ophthalmological examination revealed "a small amount of choking and marked edema of the discs with obliteration of the normal disc outline." There was tremor of both hands and incoördination. At times, she complained of exacerbation of the headache, with radiation of severe pain to the right thigh. Lumbar

punctures were repeatedly performed with the removal of large quantities of turbid fluid under increased pressure. The cell count remained about 1800 cells per cubic millimeter. The turbid fluid persisted and at the end of one month it was decided to perform a radical mastoidectomy on the left side, in the belief that this may be a constant source of infection. This was done and a small amount of pus and debris was found and removed. Following the operation, the patient appeared to have improved; headache had been relieved; the temperature became normal; the discharge from the

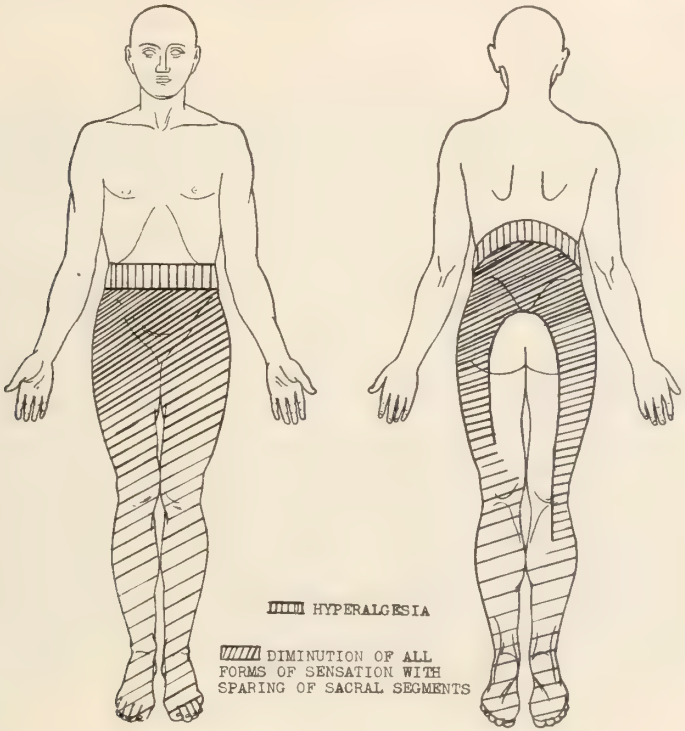


FIG. 1. Diagram of sensory disturbances

left ear ceased; the wound healed and she began to gain weight and strength. Another specimen of cerebrospinal fluid obtained about one month after the operation, was still turbid, but smears and cultures still failed to reveal any organisms. The patient began to complain of pain at the "base of the spine" and in both lower extremities. It continued for about 3 months and then subsided. She was discharged from the Gorgas Hospital in July 1932. In May 1933, about 7 months prior to her admission to the Mount Sinai Hospital, she began to experience stiffness of the legs and progressive difficulty in walking so that she was confined to her bed most of the time. She was admitted to the Mount Sinai Hospital, December 11, 1933.

Examination. On admission to the hospital she displayed slight inquality of the pupils and the palpebral fissures; impairment of all forms of sensation with relative sparing of the lower sacral segments below the 8th thoracic segment (fig. 1). There was a spastic paraparesis with bilateral pyramidal tract signs. The left upper abdominal reflex was feeble, the others were not elicited. There was no disturbance of sphincteric control.

Course. In arriving at a diagnosis it was noted that she presented a level lesion of the spinal cord. The record of antecedent turbid spinal fluid indicates that there had been a purulent meningitis although no bacteria

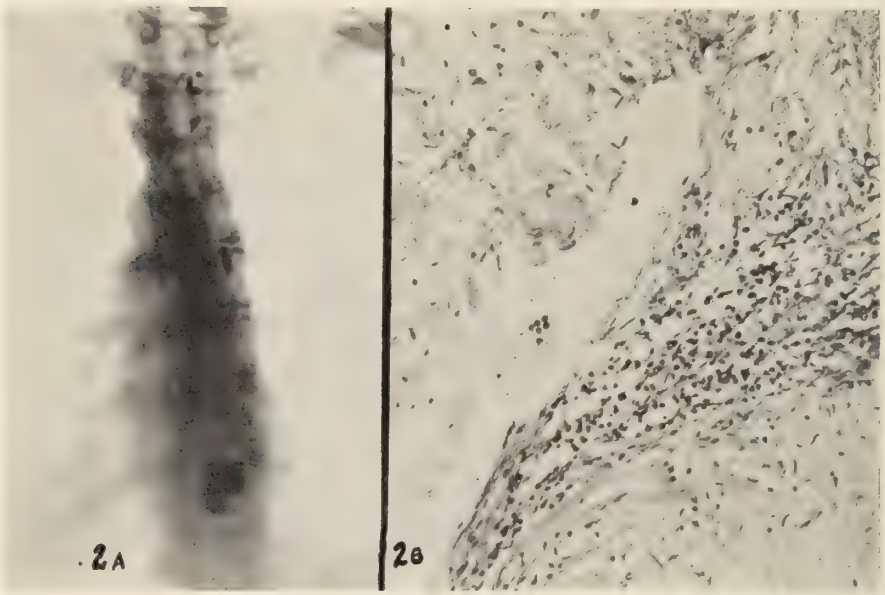


FIG. 2. *A*, showing arrest of lipiodol in the subarachnoid space. *B*, Piarachnoid, thickened and infiltrated.

had been found in spread or culture and it was considered that the present clinical syndrome was due to a residual lesion, in the form of adhesive arachnoiditis.

Lumbar puncture yielded clear colorless fluid containing 15 cells. The blood and spinal fluid Wassermann reactions were negative. Lipiodol was injected by Dr. Globus via the cisterna magna with resultant arrest of the iodized oil at the level of the 10th dorsal vertebra and a scattering of lipiodol droplets being held at the 4th, 5th, 6th, and 7th dorsal vertebrae (fig. 2 a). The patient was then subjected to an exploratory laminectomy by Dr. Ira Cohen. When the dura was divided, the cord was not seen but instead a considerable amount of grayish yellow tissue was found in the

lower part of the exposed area. Higher up the cord appeared normal, though not pulsating. From this point caudad, the exudative plastic material seemed to be intimately adherent to the cord. By gentle blunt dissection, much of this adherent process was separated from the cord. There was no evidence of cerebrospinal fluid escaping above or below in the operative area but some lipiodol globules were observed to float to the surface.

Pathological report (by Dr. J. H. Globus). "Sections of fragments of pia arachnoid stained with hematoxylin and eosin reveal a subacute inflammatory process of the tissues examined (fig. 2 b). Throughout the sections, there are lymphocytes, plasma cells, eosinophiles and phagocytic cells. In one region, there is a ring zone of cells containing pyknotic nuclei and another area of degeneration. There is a small area which appears calcified and in the same region there are small psammoma bodies. The visceral portion of a fragment of the dura also presents evidence of a subacute inflammatory process."

Immediately after the operation, there was retention of urine and constipation. This condition gradually improved, and there was also a gradual return of motor power in the paretic extremities. The patient was then given deep X-ray treatment over the dorso-lumbar spine, according to the method followed in the treatment of this condition. A steady recovery of sensation in these extremities followed. It began with the return of vibratory sense and was followed by complete restoration of normal perception of pain and temperature sensations. The sensory level disappeared. When discharged the patient could stand but was still unable to walk.

COMMENT (BY DR. ISRAEL STRAUSS)

The etiological factor causing the meningitis in this case was not determined during her acute illness. It is, however, well known that occasionally in meningococcus meningitis, the meningococcus cannot be recovered either by culture or in spreads. It was because of the persistence of a meningitic process which was regarded as a meningitis sympathica, that the operation upon the mastoid was performed. A meningitis sympathica from a focus in the mastoid without any intracranial complications does not persist as long as it did in this case. A further proof that the meningitis was bacterial in nature was that subsequent to the active meningeal process there supervened a chronic adhesive arachnitis. Such a reaction of the membrane does not occur following meningitis sympathica because of the absence of any true inflammatory process. The adhesive arachnitis in this case was one of the most extensive that has been seen on this service. The surgical intervention was indicated because of the level lesion caused by the arachnitis due to a compression of the spinal cord. The improvement in the patient following the freeing of the cord, as far

as was possible by the surgeon, is also evidence of the compression nature of the productive inflammatory process in the meninges. The prognosis in a case of this kind is not favorable. Probably considerable damage has been done to the fibre tracts in the cord and yet considerable restitution of function is still possible. Furthermore, it has been found and reported by Dr. Selinsky that in other cases of arachnitis deep X-ray therapy over a long period of time has an extremely beneficial effect.

REFERENCES

(1) Stookey, B.: Adhesive Spinal Arachnoiditis Simulating Spinal Cord Tumor. Arch. Neurol. and Psychiat., 17: 151, 1927.

(2) Globus, J. H., and Strauss, I.: Intraspinal Iodolography. Arch Neurol. and Psychiat., 21: 1331, 1929.

(3) Selinsky, H., and Harris, W.: Radiotherapy in Disseminated Spinal Arachnoiditis. N. Y. State J. M., 34: 85, 1924.

SCIRRHOUS LESIONS OF THE STOMACH AND COLON (LINITIS PLASTICA)[1]

MARCY L. SUSSMAN, M.D.

[*Department of Dr. L. Jaches*]

History (H. N. 345, 718). The patient a male, aged 48, was admitted to the Service of Dr. A. A. Berg on December 12, 1933. For about 11 months prior to his admission he complained of pain in the epigastrium and both hypochondriac regions. The pain at first was cramp-like in character and occurred regularly during every meal. Subsequently, in the course of nine months, the pain became more irregular and remittent, but two months before his admission to the hospital the pain became more severe and would prevent the patient from finishing his meal. More recently the attacks of pain became longer in duration. The administration of alkalies gave no relief. In the course of his illness the patient lost 20 pounds in weight.

Examination. The patient was a thin cachectic-looking man. He appeared weak. The chest revealed dulness and broncho-vesicular breath sounds over the right upper lobe superiorly from the apex to the level of the fourth dorsal vertebra. The heart was normal except for a systolic murmur at the apex. The abdomen revealed no palpable masses on repeated examinations. The prostate was large and disclosed induration of the left lobe. There was distension of the left seminal vesicles. Sigmoidoscopic examination was negative.

Laboratory findings. Hemoglobin 75 per cent, white blood cells 5600 (polymorphonuclear leukocytes 60 per cent, lymphocytes 36 per cent, monocytes 3 per cent). The urine and the blood Wassermann tests were negative. The blood chemistry was as follows: urea 14 mgm., sugar 120 mgm, cholesterol 190 mgm. Cholesterol esters 95 mgm. per 100 cc. Amylase 2.8 units. Gastric test meal without histamine showed free hydrochloric acid up to 32 with a total acid of 42.

Roentgenographic examination of the gastro-intestinal tract, following a barium meal, showed the following: The stomach was long, narrow, appeared rigid and displaced somewhat to the right; it emptied very rapidly. At no time was peristalsis noted. The appearance suggested a "leather bottle" stomach (fig. 1). On some of the films, taken in the upright position, fluid levels were noted in the colon. For this reason a barium

[1] Presented before the clinical conference of the Mt. Sinai Hospital, February 24, 1933.

enema examination was advised. This was performed and revealed an irregular filling defect of the transverse colon about 8 inches in length



FIG. 1. Stomach immediately after the ingestion of barium. Note the narrowing of the entire stomach and absence of evidence of peristalsis. Note evidence of rapid emptying.

extending from the ascending colon to the distal transverse colon (fig. 3). There was a marked constriction and partial obstruction at this site.



FIG. 2. Appearance of colon twenty-four hours after ingestion of barium meal. Note irregular constrictions of ascendens and hepatic flexures as well as of the distal transverse colon.

The ends of the constricted portion were more narrowed than the middle. These findings were confirmed at the examination made twenty-four hours after the ingestion of the barium meal (fig. 2).

There was, therefore, roentgenographic evidence of constricting organic lesions of stomach and colon, and while it was thought most likely to be



FIG. 3. Appearance of colon following a barium enema. Note constant irregular constriction of transverse colon.

due to neoplasm, the possibilities of a hyperplastic tuberculosis, a non-specific granuloma of the colon or syphilis had also to be considered.

Course. An exploratory operation by Dr. A. A. Berg revealed that the stomach was involved in its entirety by an infiltrating lesion, but it was not adherent to adjacent viscera. There was no glandular involvement and no apparent liver metastases. The colon from the mid-transverse to the cecum was the seat of a similar infiltrating process which had stenosed the lumen and produced a thickening of its walls. A few glands were palpable in the right meso-colon.

An ileocolic resection was performed with removal of about $4\frac{1}{2}$ inches of the terminal ileum and $12\frac{1}{2}$ inches of the proximal colon. A side-to-side isoperistaltic anastomosis was then made between the terminal ileum and the upper portion of the sigmoid.

The post-operative course was uneventful, and the patient was discharged improved.

Pathological report. The removed colonic specimen showed a stenosed lumen. The mucosa had the appearance of a linitis plastica. The microscopic diagnosis was *infiltrating scirrhous carcinoma.* It was the pathologist's impression that the lesion was primary in the stomach and that there was a secondary metastatic involvement of the colon.

COMMENT

The usual form of scirrhous carcinoma of the stomach is easily recognized by the diffuse thickening of all of its coats, the contraction of the organ, its reduction often to a rigid tube, the frequent presence of metastases and especially by its microscopic appearance, its character being that of a round cell, alveolar or gelatinous carcinoma (1). It is well known, however, that the epithelial cells in scirrhous gastric carcinoma may become reduced to a few remnants or may even largely disappear. Considerable areas of thickened submucosa and muscularis may show no traces of epithelial covering.

The term "linitis plastica" includes a large number of anomalous conditions, most of which are undoubtedly carcinomatous in origin, although it is possible in rare instances for chronic gastritis with scarred ulcers or late syphilis as well as atrophying fibrous processes to simulate fibrocarcinoma. Many reported cases showed multiple thickenings throughout the peritoneum, intestine, colon and rectum. It has been pointed out that the intestinal lesion is chiefly sub-serous and that extensions readily pass from the stomach to the omentum and colon. The structure of these peritoneal plaques and intestinal thickenings is similar to that of the primary tumor. The peritoneal thickenings may result in intestinal obstruction due to adhesions.

It seems that the growth potency of cells in this type of carcinoma is much less than that of frank carcinoma or else the resistance of the patient is a factor in retarding growth. The disease pursues a chronic course, tending to spontaneous regression of the tumor process, without however,

affecting the terminal fatal issue. The wide dissemination over the duodenum, peritoneum and colon in this case suggests that the process was at one time more active, and then regressed. It is, therefore, not unusual for a patient apparently to recover from gastro-enterostomy nor is it unusual for gastric symptoms to precede detection of the disease by many years. In this case colonic operation gave the patient full relief of symptoms for the time being at least.

REFERENCES

(1) Ewing, J.: Neoplastic Disease. 3rd ed. Philadelphia, W. B. Saunders Co., 1929, p. 685.

ABDOMINAL PUNCTURE AS AN AID IN THE DIAGNOSIS OF ACUTE INTRA-ABDOMINAL LESIONS[1]

ERNEST E. ARNHEIM, M.D.

[*Surgical Service of Dr. Harold Neuhof*]

The purpose of abdominal puncture is to demonstrate the presence of intra-peritoneal fluid in acute intra-abdominal lesions and to observe its character and bacteriology as an aid in diagnosis. The procedure is of particular value in cases of intra-abdominal injury and acute peritonitis of uncertain origin. In carrying out the abdominal puncture in the cases herein reported the technique first employed by Neuhof and Cohen (1) was used. The puncture is usually made in the lower abdomen, lateral to the rectus muscle and on the side free of possible peritoneal adhesions. The skin of the abdominal wall is sterilized and a small incision is made in the skin so as to obviate force in the introduction of the needle. A lumbar puncture needle with the stylet in place is used. As the resistance of the abdominal fascia and musculature is met and passed the needle enters the peritoneal cavity. The stylet is then removed and a syringe attached. Suction is employed and continued as the needle is being withdrawn. Failure to obtain fluid does not exclude its presence. Often a drop or two is sufficient for study. Microscopic examination of the fluid is essential.

The following cases illustrate the manner in which abdominal puncture assisted in reaching a correct diagnosis.

Case I. Violent blow to the body with rupture of liver. (H. N. 338739.) A man aged 43 was admitted on May 17, 1932 a few hours after having sustained a blow to the right lower chest and upper abdomen. He complained of pain in the right lower chest. There was slight spasticity of the abdomen, most marked in the right upper quadrant. His general condition was good and there was no evidence of shock. An abdominal puncture in the right upper quadrant disclosed free blood. This finding led to the diagnosis of liver injury, and surgical interference was decided upon. At operation a tear in the right lobe of the liver with active bleeding was found. The abdominal puncture in this instance demonstrated the presence of visceral injury at a time when the clinical evidence of an intra-abdominal injury was rather vague.

Case II. Acute pelvic inflammatory disease (gonorrheal). (H. N. 349138.) A woman, aged 35, was admitted on February 17, 1933, complaining of pain in the right lower quadrant for two days. There was

[1] Presented before the Clinical Conference of Mt. Sinai Hospital, March 24, 1933.

tenderness and slight spasticity in both lower quadrants, more so in the right. Pelvic examination disclosed a small tender mass posterior to the uterus. The diagnosis rested between acute appendicitis and acute pelvic inflammatory disease. An abdominal puncture in the left lower quadrant revealed purulent fluid containing many polymorphonuclear leucocytes. In one of these leucocytes there were many intracellular gram negative diplococci. No other organisms were found. This finding indicated pelvic peritonitis of gonorrheal origin. It was decided to observe the patient for a while without operative interferences. The condition subsided in a few days.

Case III. Acute salpingitis. (H. N. 333637.) A woman, aged 21, admitted on Feburary 26, 1931, gave a typical history of acute appendicitis with the characteristic radiation of pain. The entire right side of the abdomen was tender and spastic. On pelvic examination there was a small tender mass in the right fornix. Abdominal puncture was carried out in the left lower quadrant and yellow purulent fluid containing many polymorphonuclear leucocytes but no organisms was obtained. The absence of organisms in the pus was interpreted as indicating that the peritonitis was not due to an acute inflammation in the intestinal tract. The clinical picture, however, was so typical of acute appendicitis, that in spite of the abdominal puncture findings, operation was performed; an acute salpingitis was found. It would seem that in this case the abdominal puncture findings were more accurate than the clinical signs.

Case IV. Streptococcus peritonitis. (H. N. 281126.) A male infant of six months was admitted to the hospital June 27, 1927, with the history of fever and diarrhea for one week. He was acutely ill. The temperature was 104°. The abdomen was markedly distended and rigidity was most marked in the right lower quadrant. An abdominal puncture in the left lower quadrant revealed purulent fluid containing gram positive cocci in chains. Cultures proved these to be hemolytic streptococci. Clinically it was evident that the child had a diffuse peritonitis but in view of the possibility of an acute appendicitis as its source, operation was contemplated but withheld when later a pure culture of streptococcus was obtained from the abdominal puncture material. Metastatic foci in the form of abscesses developed, cultures from which contained streptococcus hemolyticus. The peritonitis gradually subsided and the child recovered.

Case V. Peritonitis of appendicial origin. (H. N. 335325.) A 28 year old man admitted February 15, 1934 was operated for an acute gangrenous appendicitis with diffuse peritonitis. A pre-operative abdominal puncture in the left lower quadrant showed foul smelling purulent fluid containing gram negative bacilli. The patient's condition was good for one week after operation and then his temperature began to rise. There was no wound infection or pelvic abscess. In order to determine the condition of the free peritoneal cavity, an abdominal puncture was made in the left

lower quadrant. A few drops of yellow odorless fluid was found. This contained a few polymorphonuclear leucocytes but no organisms. The conclusion drawn from the abdominal puncture was that the peritonitis had subsided and that an explanation for the rise in temperature must be found elsewhere. On further study the fever was found to be due to a subphrenic abscess which was drained and the patient recovered.

This case is presented to illustrate the value of abdominal puncture in following the course of peritonitis.

Case VI. Acute pancreatitis. (H. N. 350415.) A 42 year old male was admitted March 28, 1933 complaining of severe peri-umbilical pain and vomiting for five days. His temperature was 101° and the blood count displayed a marked leucocytosis. Tenderness and spasticity were present in the left upper quadrant. Abdominal puncture in the left lower quadrant disclosed fluid resembling beef juice. It contained polymorphonuclear leucocytes but no organisms. This beef-juice like fluid had been described by Neuhof and Cohen (1) in abdominal punctures in cases of acute hemorrhagic pancreatitis. The pain and abdominal signs subsided in a few days and subsequent abdominal punctures were negative. The clinical picture and the findings of abdominal puncture suggested the diagnosis of acute pancreatitis.

COMMENT

Abdominal puncture should be reserved for doubtful cases of acute intraperitoneal diseases. It is not needed in the cases with a clear cut clinical picture. It is contra-indicated in the cases of chronic or subacute intraperitoneal lesions because in such conditions a loop of intestine may be adherent or fixed. If these criteria are followed abdominal puncture will be found to be a safe procedure.

REFERENCE

(1) Neuhof, H., and Cohen, I.: Abdominal Puncture in the Diagnosis of Acute Intraperitoneal Disease. Ann. Surg., 83: 454, 1926.

RADIOTHERAPY FOR BRONCHORRHEA IN BRONCHIECTASIS[1]

MAURICE BERCK, M.D.

[*Service of Dr. Harold Neuhof*]

The purpose of this communication is to state the rationale and report the results of radiotherapy in the treatment of a case of bronchorrhea in bronchiectasis. The successful treatment of hypertrophic sialadenitis and salivary gland fistulae by radiotherapy, producing diminution and suppression of salivary secretion, led to the thought that an analogous effect might be produced upon the bronchorrhea of bronchiectasis by heavy dosage of radiotherapy applied to the affected lung fields. The purpose of the application of the radiotherapy, briefly, is to render the hypertrophic hypersecreting bronchial mucosa atrophic and thus convert a "wet" bronchiectasis into a "dry" bronchiectasis.

Salivary epithelial cells that secrete mucus are much more susceptible to Roentgen-rays than ordinary epithelial cells. There is reason to believe therefore, that the mucus-secreting cells of the bronchial mucosa and of the bronchial mucus glands are equally radiosensitive. If such is the case, degeneration of the mucus-producing cells of the bronchi and their mucus glands should be an early response in the pulmonary reaction to irradiation.

In this connection the following quotation from Desjardins (1) is significant: "Experiments on animals have proved fairly conclusively that the radio-sensitivity of the pleura and lungs is approximately the same as that of the overlying skin. However, the mucus secreting cells of the epithelium lining the bronchi and of the mucus bronchial glands are more radio-sensitive than other epithelial cells and are the first to react by undergoing mucoid degeneration. There occurs a pouring out of an increased quantity of mucus for a time, but later the quantity of secreted mucus diminishes."

The experience with a single case, of course, is insufficient to establish the usefulness of radiotherapy in the treatment of bronchiectasis. However, it is thought advisable to draw attention to this method of treatment of bronchorrhea in bronchiectasis and to report the success of treatment in a case. A larger number of similar cases of bronchorrhea are now receiving radiotherapy which is applied to the area of hypersecreting bronchiectasis, and parallel results are being obtained.

[1] From the surgical service and the out patient department of the Mount Sinai Hospital.

CASE REPORT

History (H. N. 344718). The patient, a male, 46 years of age, entered the hospital September 24, 1931, with a history of chronic lung abscess of ten months' duration. A large putrid lung abscess of the right upper lobe was evacuated at operation. Profuse purulent expectoration persisted after the operation and another abscess below the former had to be evacuated by a second operation. Profuse expectoration continued unchanged. A third abscess was then localized directly medial and adjacent to the others and was evacuated at a third operation without appreciable improvement. The patient was discharged expectorating profuse amounts of purulent sputum. He had three large bronchial fistulae in the right upper anterior chest draining large amounts of rancid muco-pus. He was distressed by frequent cough. The patient was readmitted January 3, 1932, and another small abscess was found between the sites of the previous operations. It was opened and drained, but a profuse muco-purulent non-putrid bronchorrhea (6 to 20 ounces daily) continued. It was associated with profuse drainage from the four anterior broncho-cutaneous upper lobe fistulae. Bronchoscopy no longer revealed foul pus as it had on all previous occasions. Roentgen ray examination did not reveal any other abscess or infiltration. Lipiodol bronchography through the broncho-cutaneous fistulae revealed contiguous sacculated and cylindrical bronchiectasis. Cough was frequent and productive of 6 to 20 ounces of non-foul muco-purulent material daily. External drainage from the four bronchial fistulae was profuse, requiring frequent changes of large dressings which would quickly become saturated with greenish yellow muco-pus. He left the hospital with abscesses cleared up but with profuse muco-purulent expectoration (as high as 20 ounces daily) and discharging fistulae. He was referred to the outpatient department of the hospital for further observation.

Treatment. Radiotherapy in the case was initiated on January 20, 1932; and carried out under the direction of Dr. W. Harris in the following way. The patient received a total of 33 treatments with high voltage X-ray consisting of 180 k.v. through 5 mm. copper filtration at 40 cm. distance (size of field 15 by 18 cm.). Seventeen of these treatments were applied to the right upper chest anteriorly and 16 were given to the right upper chest posteriorly (the affected lung fields).

The treatments of approximately $3\frac{1}{2}$ minutes long were given every 4 to 5 days with a dosage of 86 international roentgen units per seance.

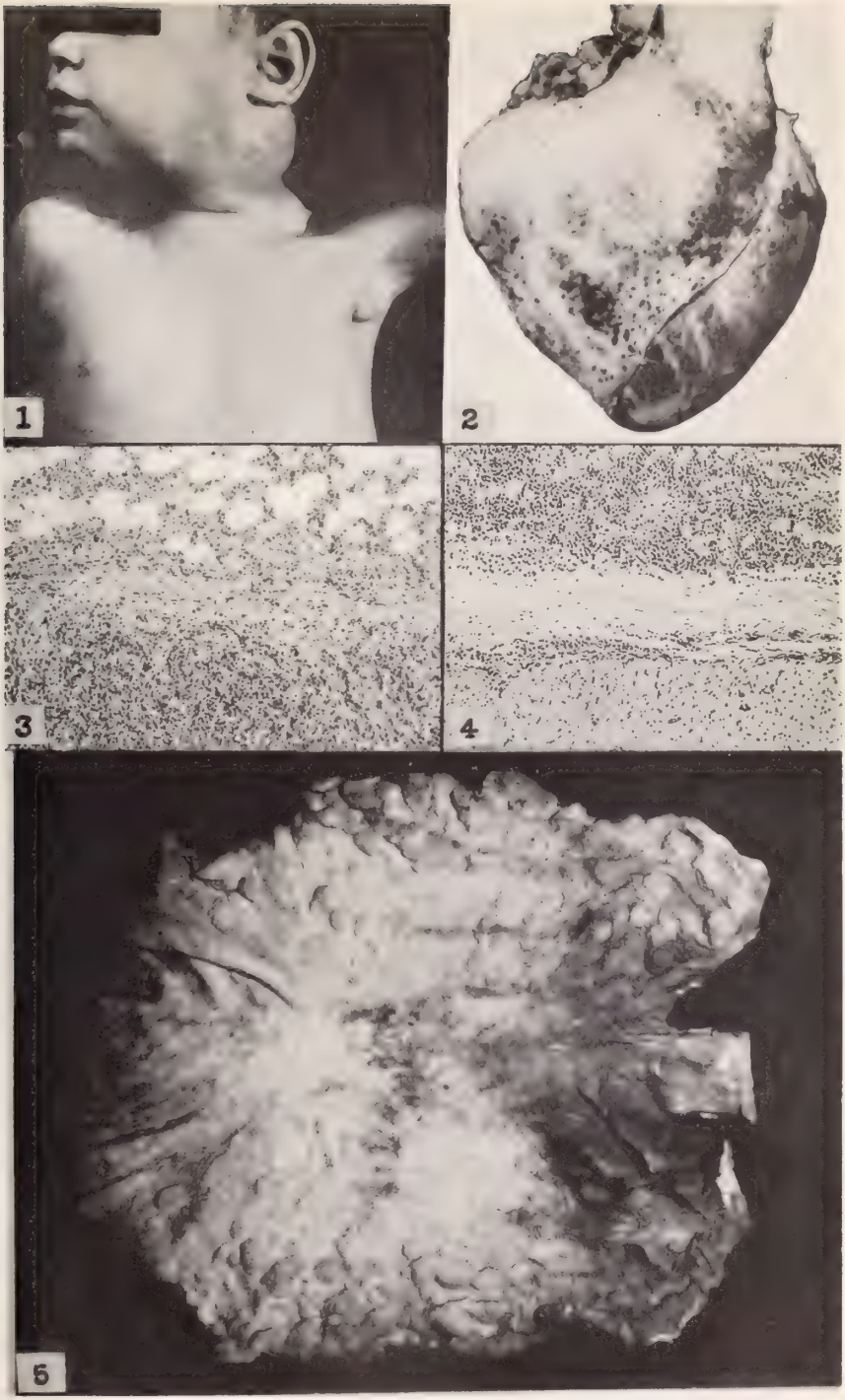
The right upper anterior chest received a total of 1500 international roentgen units. A similar amount was given to the right upper posterior chest.

Within 8 weeks after the beginning of the radiotherapy a remarkable improvement had taken place. A very small amount of odorless thin

muco-pus now issued from the bronchial fistulae. The fistulous openings now appeared pink, contracted and healthy, whereas formerly they appeared inflamed and constantly coated by muco-pus. Cough and expectoration were definitely greatly diminished; the patient now coughed only when arising in the morning and then expectorated but a small amount of thin mucus mixed with saliva. Six months of radiotherapy resulted in a remarkable improvement. The patient's condition has remained constantly good since the initial great change in his condition, 8 weeks after the beginning of radiotherapy. He was recently seen in the follow-up clinic (May 20, 1934, approximately 1 year after treatment) and found to be in health. The bronchial fistulae are open, but are almost dry. Expectoration is limited to about one ounce of thin odorless mucus, brought up in the early morning.

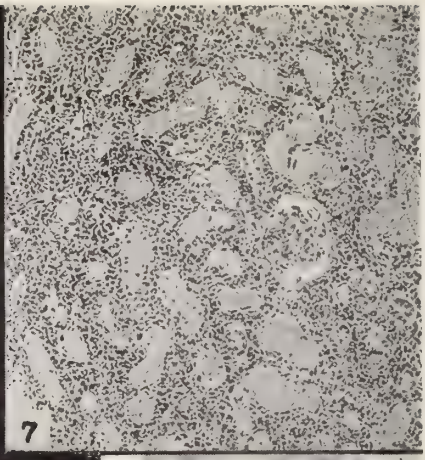
REFERENCE

(1) Desjardins, A. V.: Action of Roentgen Rays and Radium on the Heart and Lungs. Am. J. Roentgenol., 28: 161, 1932.

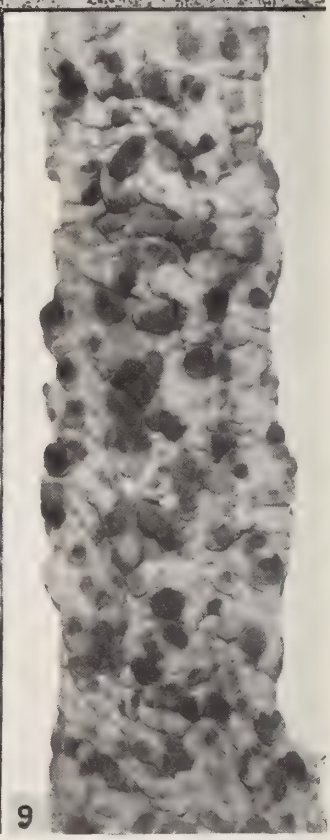


(Sadao Otani: Acute Leukemia)









(Sadao Otani: Acute Leukemia)

ACCESSIONS TO THE PATHOLOGIC MUSEUM

Acute Leukemia

SADAO OTANI, M.D.

The hyperplastic changes characteristic of leukemia are not limited to individual organs, but may involve the entire system of tissues with hematopoietic potentialities. Frequently, only those parts of the body are affected which are commonly considered as hematopoietic organs. Occasionally, however, even such portions are afflicted which have no apparent direct relation to blood cell formation. This may cause extensive infiltration of hematic cells in practically every part of the body. Such instances are explained by the fact that in early embryonal life the entire mesenchyme has the ability to form blood cells, and that this capacity, dormant in post-embryonal life, can be revised by unusual stimuli. This situation arises particularly in cases of acute leukemia. In these instances a distinction between lymphatic and myeloic blood cells is often impossible because they conform with the immature, undifferentiated hematic cell. On the other hand, immature cells which are already oriented toward the myeloic type may infiltrate the lymphatic tissues. Thus it would seem that a strict separation of lymphatic and myeloic leukemia is not appropriate in the acute forms of the disease.

EXPLANATION OF PLATES I AND II

1. Male child, five years. Lymph node enlargement in acute myeloblastic leukemia.
2. Boy, fourteen years. Acute myeloblastic leukemia. Diffuse infiltration of epicardium.
3. Histology of lymph node, Case 1. In acute leukemia the capsule and adjacent fat tissue is often infiltrated by hematic cells.
4. Histology of case 2.
5. Female, twenty-eight years. Infiltration of stomach.
6. Same case. Infiltration of kidney.
7. Histology of kidney.
8. Same as 3. Infiltration of Peyer's patches, and mesenteric lymph nodes in acute myeloblastic leukemia.
9. Male infant, fifteen months. Infiltration of folds of large intestine in undifferentiated (hemocytoblastic) leukemia.

ABSTRACTS[1]

The full thickness skin graft. John H. Garlock. Ann. Surg. 97: 259, February 1933.

The various aspects and indications for the use of this graft, in contra-distinction to the Thiersch graft, the small deep graft, and the split thickness graft are discussed. The full thickness skin graft should not be used to cover a granulating area. A major portion of the paper is taken up with the consideration of the technical problems involved in the operative procedure itself.

Sensitization and desensitization in man with snake venom. Samuel M. Peck. Arch. Derm. Syph. 27: 312, February 1933.

Hypersensitivity to moccasin venom developed in 75 per cent of the patients with allergic manifestations after a number of intradermal injections. A changed reaction developed in 50 per cent of non-allergic patients treated in the same manner. Desensitization was possible in fifteen of the sixteen cases in which it was attempted.

Specific "reagents" in the blood of hypersensitive persons could be demonstrated in only one of the four cases in which passive transfer was attempted.

Excretion of bile-pigments in experimental obstructive jaundice. U. J. Salmon. Surg. Gynec., Obst. 56: 621, March 1933.

In long standing obstructive jaundice in dogs, bile pigments are eliminated into the gastro-intestinal tract and can be detected as bilirubin in the small bowel and as urobilinogen in the large bowel. Twenty-two milligrams of bilirubin per 100 cc. of blood was established as the threshold value above which bile pigments begin to appear in the intestinal tract. The reappearance of bile pigments in the stools of a clinical case of long standing, obstructive jaundice may therefore be due to bile-pigments eliminated into the bowel with the gastro-intestinal secretions.

The Neurosurgical Department in the Hospital. Ira Cohen and Joseph Turner. Mod. Hosp., March 1933.

Neuro-surgery is a natural and desirable subdivision of surgery. In addition to caring for brain and spinal cord tumors, a neurosurgical service can make contact with many of the clinical divisions. Its relation to the Department of Radiotherapy in treating intractable pain is stressed.

Effect of tonsillectomy and adenoidectomy on immunity to diphtheria. Anne Topper and Sidney Leader. Am. J. Dis. Child. 45: 735, April 1933.

In a large series of children who were susceptible to diphtheria as evidenced by a positive Schick test, 66.6 per cent developed a negative Schick re-test six months after tonsillectomy and adenoidectomy; whereas ordinarily this would have occurred in only about 15 per cent of cases.

Evidently tonsillectomy favors the development of a humoral immunity to diphtheria.

[1] Authors' abstracts of papers published elsewhere by members of the Mount Sinai Hospital staff.

P-Wave changes in acute coronary artery occlusion. Arthur M. Master. Am. Heart J. 8, 4, p. 462, April 1933.

The change in the P-Wave in the electrocardiogram is a new electrocardiographic sign of acute coronary artery occlusion. There is evidence that the larger P-Wave observed early during the course of an acute coronary artery occlusion is indicative of a dilated auricle. It is suggested that this chamber takes over a portion of the work of the injured ventricle.

Electrosurgery. Howard Lilienthal. Ann. Surg. 97: 801, June 1933.

Skin wounds rapidly made by means of the electric knife heal by primary union. With electrocoagulation hemorrhage is minimized and infection from catgut is rare.

The following operations have been performed with the electric technic: apicolysis, thoracoplasty, breast amputation, abscess of the lung, empyema, carcinoma of the lung, appendicitis, operations upon the gall bladder, hernia etc.

The principal use of electrosurgery is for making the incision through skin, fascia and muscles.

The author believes that the application of electrosurgery will rapidly increase.

Hypoproteinemia. Eli Moschcowitz. J. A. M. A., 100: 1086, April 8, 1933.

Hypoproteinemia is common to many disorders and may result from (a) loss of protein, (b) deficient formation, or destruction of plasma protein, and (c) insufficient intake of protein.

Protein may be lost (a) by way of kidneys (nephrotic type), (b) by chronic diarrhea, (c) in anasarca, and (d) by loss of blood.

Hypoproteinemia due to deficient formation or increase destruction of plasma protein is one of the essential features of pernicious anemia.

Hypoproteinemias resulting from insufficient intake of protein arise in the conditions previously known as war edema, famine edema, hunger edema, prison edema and the edema associated with cachexia.

Hyproteinemia produces the syndrome that has hitherto been classified under the heading "nephrosis;" namely, edema, inversion of the albumin-globulin ratio, lipemia and usually a lowered basal metabolism. The term "nephrosis" should be relegated to those forms of hypoproteinemia that are exclusively renal in origin. "Nephrosis" cannot be classified as a disease because it has multiform backgrounds in morbid anatomy.

The fundamental cause of the edema is the hypoproteinemia, and the mechanism is that suggested by Epstein; namely a reduction in the osmotic pressure of the serum protein. This has been conclusively shown both clinically and experimentally. The appearance and intensity of the edema parallels the reduction of the albumin fraction rather than the total plasma protein, because the albumin has a much higher osmotic tension than the globulin and the fibrinogen, the other important protein components of the blood plasma.

The circulating electrolytes have an important influence in modifying the edema associated with hypoproteinemia, and the evidence is strong that it is the sodium ion and not the chloride ion that tends to aggravate the preëxisting edema. Calcium and potassium seem to have the opposite effect.

Edemas of cardiac origin are not directly related to hypoproteinemia, except in certain instances of malnutrition. In edemas of purely cardiac origin the increased capillary permeability plays the essential rôle.

The lipemia and the lowered basal metabolism in hypoproteinemia are still unexplained.

Reclassification of the anemias. Reuben Ottenberg. J. A. M. A., 100: 303 April 29, 1933.

This paper is a review of the recent work on anemias. It proposes a new classification of anemias, dropping the old conception of primary and secondary types. The anemias are divided into (1) deficiency-diseases, (2) diseases of the blood making organs and (3) hemolytic processes.

Tubular adenoma (arrhenoblastoma) of the ovary. Frank Spielman. Am. J. Obstet. Gynec. 25: 517, April 1933.

An arrhenoblastoma of the ovary is described. It occurred in a 26 year old female who had amenorrhea, hypertrichosis of face, abdomen and back, large clitoris, baritone voice and small breasts. On physical examination the pelvic findings were negative except for a large retroposed uterus, but female sex hormone studies, first to be made on any of such case, showed complete absence of the cycle in the blood. The patient died 3 years after these studies were made of an unrelated cerebral hemorrhage. At autopsy an arrhenoblastoma was found in the right ovary. Though signs of masculinization are often associated with this type of tumor, other types of ovarian neoplasms, as well as tumors of the adrenals and pituitary may give the same picture.

The effect of elevated metabolism on the hearts of frizzle fowl. Ernest P. Boas and Walter Landauer. Am. J. M. Sc. 185: 654, May 1933.

Frizzle fowl, owing to their scanty plumage exhibit a profound disturbance of heat regulation with a resulting high basal metabolism in the absence of hyperthyroidism. We have shown that Frizzle hens have heart rates 27 per cent, and Frizzle roosters 68 per cent above that of normal chickens. We have weighed the hearts of 110 chickens by a modification of Müller's method. Of these 37 were normal females, 33 Frizzle females, 20 normal males and 20 Frizzle males. In proportion to body weight the total ventricular weight of Frizzle chickens is significantly greater than that of normal chickens. In Frizzle pullets the difference is 0.7 with an error of 0.14. The ratios between right and left ventricles, whether or not the septum be included, are practically the same for Frizzle as for normal fowl, so that both ventricles share equally in the hypertrophy that takes place. It would appear that hypertrophy, as well as tachycardia are conditioned only by the high metabolism of the Frizzle fowl. The fact that an increased metabolism alone may cause cardiac hypertrophy and tachycardia suggest that in Graves' disease the elevated metabolism per se increases the work of the heart, and in this manner directly contributes to the cardiac disturbances that are so commonly observed.

This abstract covers the original article in May 1933. A new one to appear in a few months in Archives of Internal Medicine.

Osteomyelitis of the skull Ira Cohen. Ann. Surg. 97: 733, May 1933.

Thirteen cases of osteomyelitis of the vault of the skull are reported. Among them are seven which followed nasal sinus infection: two were metastatic, two traumatic, and two probably primary in origin. The insidious onset, the serious character of the condition, the frequency of intracranial complications, and several therapeutic measures are discussed.

Tumors affecting the optic chiasm and optic tracts. Joseph H. Globus. Arch. Ophth. 9: 729, May 1933.

The author discusses the syndromes of tumors of the chiasmal region, the temporal lobe, occipital lobe, and quadrigeminal plate. Since the foremost therapeutic measure lies in early neurosurgery, emphasis is placed upon visual field disturbances

as the diagnostic means which lead to accurate localization of the neoplasm. The importance of the visual field studies is illustrated and stressed, particularly in tumors of the temporal lobe.

A new therapy of peptic ulcer. Continuous alkalinized milk drip into the stomach. Asher Winkelstein. Am. J. M. Sc. 185: 695, May 1933.

1. Constant neutralization of the free hydrochloride acid in the stomach throughout the twenty-four hours of the day is regarded as the logical and desirable therapeutic state in peptic ulcer.

2. A very high nocturnal secretion is noted in ulcer patients even during the Sippy treatment.

3. The new therapy consists in allowing a solution of milk and bicarbonate of soda to drip continually through a Rehfuss tube into the stomach at a rate of thirty drops a minute day and night.

4. Satisfactory results of this therapy in forty-two patients are reported.

Traumatic ulcer of the duodenum and stomach. Burril B. Crohn and Julius Gerendasy. J. A. M. A. 100: 1633, May 1933.

A case is described of a duodenal ulcer occurring in a person previously free of digestive symptoms, but who had been subjected to a violent trauma directly to the epigastrium.

The American Literature contains no original references on the subject of traumatic peptic ulcer. The European Literature is reviewed.

The authors definitely believe that trauma must be accepted as a possible etiology in certain cases of gastric and duodenal ulcer.

Standards of basal metabolism of retarded growth. Anne Topper. Am. J. Dis. Child. 43: 1203, June 1933.

The basal metabolic rate may be referred to standards based on height, weight, sitting height, surface area, or age, and most children are found to conform within plus or minus 10 per cent of any of these standards.

A real discrepancy exists only in cases of normal children who are, however, very short for their age. In these children the chronological age seems to be the best standard of their basal metabolism.

Evidentally while all physical proportions are underdeveloped, the actual cellular activity, which determines the height of the basal metabolism, has proceeded normally commensurate with the chronological age.

Periarteritis nodosa in infancy and in childhood. Jacob L. Rothstein and Sara Welt. Am. J. Dis. Child. 45: 1277, June 1933.

Periarteritis nodosa is a rare disease of bizarre and varying symptomatology often resembling polymyositis or trichinosis. Clinical recognition is improbable. Diagnosis has been made by biopsy, at operation under a mistaken diagnosis or at autopsy. The characteristic perivascular infiltrations and multiple aneurysms are frequently macroscopic but may be discoverable only in microscopic sections.

All proved cases occurring in children are abstracted from the literature of this disease dating from Kussmaul (1866). Two new cases in children with post mortem findings are described in great detail and exhaustively analyzed.

The results of conservative compared with radical operations in the cerebellar medulloblastomas. An analysis of twenty-three cases. Charles A. Elsberg and Nicholas Gotten. Bulletin of the Neurological Institute of New York, Vol. 3, Nos. 1 and 2, June 1933.

The authors advocate simple suboccipital decompression followed by X-ray therapy for cerebellar medulloblastomas. They present evidence to the effect that if attempts at radical removal are made after conservative treatment and X-ray therapy the operative mortality is reduced. Furthermore, conservative surgery at the present time offers better immediate operative results, and from the standpoint of length of survival the results have been at least as good as those obtained by radical means.

Concerning the clinical features and the diagnosis of extramedullary and perineural fibroblastomas of the spinal cord. Charles A. Elsberg. Bulletin of the Neurological Institute of New York, Vol. 3, Nos. 1 and 2, June 1933.

Elsberg stresses the differential diagnosis between extramedullary meningeal and perineural fibroblastomas, and believes a correct preoperative diagnosis can be made.

The meningeal fibroblastomas more commonly occur in women older than forty years of age, whose complaints are motor and sensory disturbances in lower extremities, usually of one or two years duration. The tumor is most frequently encountered in the thoracic part of the vertebral column. Globulin and spinal fluid protein are usually but slightly increased above normal.

The perineural fibroblastomas are as frequent in males as in females and occur as often before the age of forty as after. These patients usually see the neurosurgeon earlier because of the more frequent incidence of root pains. The tumor is found as often in the cervical and lumbar regions as in the thoracic. Markedly increased globulin and spinal fluid protein are present.

Treatment of uterine bleeding with snake venom. Samuel Peck and M. A. Goldberger. Am. J. Obst. Gynec. 25: 887, June 1933.

The therapeutic effect of moccasin venom (Ancistrodon Piscivorous) on twelve cases of functional uterine bleeding is presented. The effects obtained are satisfactory enough to warrant the clinical trial of venom therapy in cases of this type. The period of observation is too short to draw any final conclusions about the permanence of the results.

Embolism of the central retinal and ciliary arteries in a case of chronic lipoid nephrosis with thrombosis of the innominate artery. I. Goldstein and D. Wexler. Arch. of Ophth. 10, No. 1: 70, July 1933.

A boy of twelve suffering from chronic lipoid nephrosis suddenly developed a hemiplegia, together with symptoms of obstruction of the right brachial artery. The right fundus showed evidence of obstruction of the central retinal artery. Autopsy revealed chronic lipoid nephrosis, arteriosclerosis, and thrombosis of the innominate artery with emboli to its branches (middle cerebral and brachial arteries). Separate occluding plugs were found in the central retinal, and in many of the branches of the posterior ciliary arteries.

Hormone diagnosis of viability of pregnancy. Robert T. Frank, M. A. Goldberger, and Frank Spielman. J. A. M. A. 101: 266, July 22, 1933.

Material is presented to show that the female sex hormone blood determination is an absolute indicator of whether or not a fetus is alive or dead. The urine pregnancy test is of value in determining a missed abortion only when the reaction is negative. The presence or absence of the hormone in the blood depends upon the degree of involution of the placenta and its attachment to the uterine wall.

VOLUME 1 SEPTEMBER, 1934 NUMBER 3

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

GRAVES DISEASE IN CHILDHOOD

Report of a Case Studied over a Period of Five Years

ERRATA

In the article "Radiotherapy for Bronchorrhea in Bronchiectasis" by Dr. Maurice Berck which appeared in the previous issue (*Journal of The Mount Sinai Hospital*, Volume I, No. 2) the following error occurring on page 99 is to be corrected: "5 mm. copper filtration" should read 0.5 mm. copper filtration.

The case reported here is interesting, first because it occurred in a boy of ten, and second, because the patient has been carefully observed over a period of five years, was not operated upon, and is considered cured.

History (H. N. 318795). An American boy, 10 years of age, was admitted to the hospital on May 3, 1929, with a history of nervousness and emotional instability of one year's duration. The father was an inmate of a State hospital suffering from a psychosis of several years duration. The mother was emotionally unstable. Two siblings were well. Aside from a "rapid heart" at the age of 5 the patient's past history was irrelevant. About one year before admission to the hospital, the boy became nervous, irritable and "tempermental." He had alternating periods of crying and laughing. He became a "behavior problem" at home and in school. He began to tire easily. Prominence of the eyes was noted.

[1] From the wards and the out-patient department of Mount Sinai Hospital.

He was sent to the "beach" where he remained for four months, and seemed to have recovered completely. He returned to school and remained well for six months. At this time, as the father's psychosis became so bad that he had to be committed to a State hospital, the boy's symptoms all recurred. He became unmanageable at home, began to lose weight and the prominence of the eyes became more marked. Enlargement of the thyroid gland was noted by the attending physician who advised hospitalization.

Physical examination. The patient was a well-developed, tall, and fairly well nourished boy (fig. 1). He resisted attempts to be put to bed,



FIG. 1

cried, fought, attempted to strangle himself, and suddenly in the midst of this demonstration, began to laugh hysterically. The skin was warm and moist, and flushed easily; dematographia was present. There were bilateral exophthalmos, lid lag, widening of the palpebral fissures, and failure of convergence of the eyes. There was a soft symmetrical enlargement of the thyroid, which included both lobes and the isthmus. A systolic thrill was felt over the right lobe, and a bruit was heard over the entire gland. The heart was normal in size, the rate 122 per minute. The heart sounds were of good quality. There was a roughened systolic murmur, heard loudest in the pulmonic area. Blood pressure was 120 systolic

and 54 diastolic. There were no abnormal reflexes, but the marked characteristic tremor of the extended fingers was present. The boy weighed 28.2 kgm. (62 pounds); his height was 130 cm.

Laboratory findings. An electrocardiogram showed a simple tachycardia. Roentgen examinations showed "a widening of the superior mediastinum, due possibly to an enlarged thyroid; a general decrease in calcium in the carpal bones; and cloudiness of the left antrum and left ethmoid."

Blood examination: hemoglobin, 75 per cent; red blood cells, 4, 120,000; white blood cells, 8,700; polymorphonuclear neutrophils, 46 per cent; lymphocites, 54 per cent.

Blood chemistry and urine examinations were negative.

Exophthalmic readings (Hertle) O.D. —17½, O.S. —16½, at 89 mm.

Basal metabolic rate was +49 per cent on the day after admission, and +40 per cent two days later.

Mental examination. The findings of the psychiatrist were summarized as follows: "A very intelligent boy who is showing pressure of mental and physical activity, disturbed behavior, mental and emotional instability, with a few mild grandiose trends; his sensorium is clear, but there is an absence of insight into his condition. Diagnosis: Mild psychosis with Graves disease."

Clinical course. On first admission to the hospital the boy was put to bed, and a diet which contained 100 per cent more than his actual basal requirements instituted. Because of the manic behavior of the child phenobarbital was given, 0.045 gm. (¾ grain) twice daily for ten days. At the end of this time, his condition was only slightly changed; the pulse remained around 122 and the basal metabolic rate +40 per cent. Medication was stopped for one week, at the end of which time his general condition showed very little improvement. Lugol's solution, 2 drops daily, was then administered for two weeks. At the end of this period, the basal metabolic rate dropped to +10 per cent, the pulse rate to 82. The tremor had almost disappeared, and prominence of the eyes became less marked. The boy began to gain weight and as his general condition improved, he was discharged June 19, 1929, 47 days after admission.

Interval history. From the time of discharge to the beginning of September, 1929, the boy was seen at monthly intervals in the out-patient department. His metabolic rate never rose above +25 per cent and the pulse rate not above 100. His general condition remained fair. During this period he gained 2 kgm. in weight. Early in September, immediately after the boy's father was brought home, he again began to exhibit nervousness, irritability and became unmanageable. On September 19, he was readmitted to the hospital with all of the characteristic symptoms of Graves disease.

Second admission. Examination at this time indicated some advance in the disease. The tremor of the hands was more marked, as were also the

exophthalmos and the tachycardia (pulse rate 136). The local thyroid manifestations (enlargement, bruit, and thrill) were unchanged. Laboratory studies were essentially normal. The basal metabolic rate was +40 per cent, the blood pressure 124 systolic and 60 diastolic. His weight was 29 kgm. (64 pounds).

The boy was put on a high caloric diet and bed rest. No medication was administered.

Two weeks after admission, the basal metabolic rate had dropped to +31 per cent, and the pulse rate to 110. The blood pressure was 114 systolic and 50 diastolic. His condition improved rapidly. He seemed to



FIG. 2

dislike the idea of going home and because of unsuitable conditions there he was kept in the hospital for four months. At the end of this period he weighed 31.8 kgm. (70 pounds), his basal metabolic rate was +16 per cent and his pulse rate was around 90. His general condition was good.

Interval history. The boy was sent to a convalescent home. A fire broke out there and he was taken back to the hospital for four days. During this period in spite of the "fire scare," and in spite of a mild attack of tonsillitis with fever of 100°, his basal metabolic rate did not exceed +16 per cent. He was returned to the convalescent home, where he remained one month, gained 12 pounds (5.4 kgm.) and seemed well and happy. His pulse rate persisted around 96.

The patient was again seen at monthly intervals in the out-patient clinic. His basal metabolic rate ranged around +25 per cent his pulse rate about 100, and in spite of the persistent tachycardia his general condition remained good. He ceased coming to the clinic for about four months and was not seen until September 29, 1930, when he was for the third time admitted to the hospital in a state of acute thyrotoxicosis.

Third admission. The boy returned in an alarming condition; he was vomiting and his temperature was 105°. There were definite signs of meningeal irritation—marked Kernig and Brudzinski signs, and neck rigidity. He was irrational, overactive and raved constantly about an operation. This reaction was thought to have been precipitated by fears of an operation recommended by a physician whose opinion was contrary to that held by the hospital staff. About one week before the date set for the proposed operation the boy became irritable, then lethargic, again maniacal and finally unconscious. At the hospital a lumbar puncture revealed normal cerebrospinal fluid under increased pressure.

All signs of Graves disease were present—the tremor, tachycardia, eye signs and enlargement of the thyroid gland. The boy's physical condition was worse than on his previous admission. He had lost 3 kgm., his weight now being about the same as on his first admission to the hospital. He had had frequent convulsive seizures during the preceding week which lasted about 5 minutes each time.

Glucose was administered intravenously, in addition to the use of codeine, bromides, chloral hydrate, and pantopon. The mental condition improved within 48 hours, although the temperature remained high for five days. The basal metabolic rate was then found to be +50 per cent. Lugol's solution, 1 drop daily was given for 12 days, at the end of which time the metabolism fell to +10 per cent, and all the symptoms were considerably improved. After medication was stopped, the metabolism rose to +16 per cent and remained at this level. The physical condition improved rapidly. The boy was discharged on November 13, 1930, after a stay of 45 days. He had gained 3 kgm. while in the hospital, his symptoms were less marked, although still present, and the basal metabolism remained around +16 per cent.

Follow-up history. See table 1, and chart 1.

COMMENT

As early as 1892, Charcot (4) and later, 1908, Stern (5) emphasized the occurrence of nervous disorders accompanying Graves disease. Very frequently the exciting cause of the condition is some psychic insult. In 72 per cent of the cases reported by Hyman and Kessel (6) psychic trauma preceded the onset. In our case, there was a very definite psychogenic factor. With rest in bed, adequate diet, and very little medication, the symptoms of Graves disease improved considerably, and it is possible that

TABLE 1

DATE	AGE		HEIGHT	WEIGHT		SITTING HEIGHT	BASAL METABOLIC RATE	PULSE	BLOOD PRESSURE	REMARKS
	yrs	*mos*	*cm.*	*kg.*	*lbs.*	*cm.*				
12/15/30*	11	10	142	38.6	85	72	plus 16%	82	118/55	Perspires freely; cardiac murmur present; exophthalmos less marked
1/18/31*	11	11	142.5	41	90	72	plus 15%	86	114/56	Condition about the same
3/19/31*	12	1	145	45.4	100	74	plus 15%	90	112/60	Boy's father ceased at Central Islip 1 month ago. Boy's condition considerably improved
6/29/31	12	4	150	47.7	105	77	plus 18%	90	115/60	Signs of puberty—voice changing; pubic and axillary hair. Behavior better. Convulsive seizures less frequent
9/20/31	12	7	155	50	110	78	plus 25%	96	118/62	Boy attends school—this may account for increased basal metabolic rate. All symptoms of Graves disease improved; thyroid gland smaller
12/12/31	12	10	156	51.3	114	78	plus 25%	96		Condition about the same
5/ 8/32	13	3	158	55	121	79	plus 20%	92		Cardiac murmur gone; no tremor; no eye signs; gland definitely smaller
12/10/32	13	10	160	56.3	124	80	plus 12%	86	112/62	Physical and mental condition excellent
2/14/33	14		161	60	131	82	plus 7%	76	110/65	Thyroid gland barely palpable; no signs of Graves disease
9/19/33	14	7	165	62.7	138	85	plus 5%	76	112/68	Normal boy in excellent physical and mental condition

3 22/34	15	1	170	63.6	140	88	plus 5%	76	112/66	Boy is in second year high school; is on the basket-ball team. Looks very well; behaves manly. Says his seizures come on about once a month only during sleep. Is being treated for these at Neurological O.P.D. Thyroid gland not palpable; no signs or symptoms of Graves disease (fig. 2)

* Boy away from home; placed with a private family in the country.

In summary: During the follow-up period of 3 years and 3 months, the patient gained 25 kgm. (55 pounds) and grew 28 cm. All symptoms of Graves disease– tremor, tachycardia, enlargement of the thyroid gland, eye signs, and hyperthyroidism gradually improved, until now they are absent. Case considered cured.

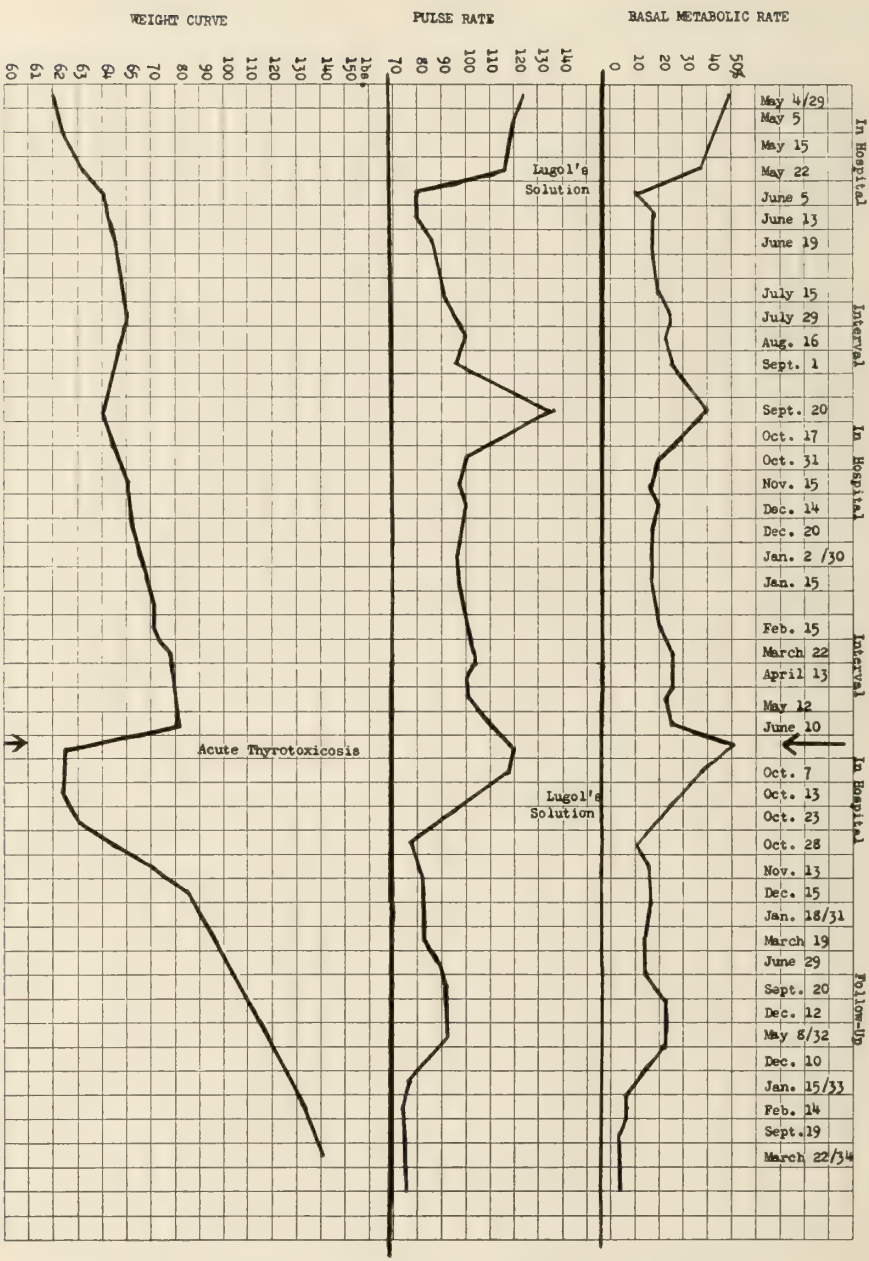


CHART 1. Showing basal metabolic rate, pulse rate, and weight curve in a case of Graves disease studied over a period of five years.

the patient might have continued to do well, had it not been for the fact that the father was brought home while still suffering from his psychosis. The boy responded to the return of his father with an acute exacerbation of his symptoms which necessitated a second admission to the hospital. Away from the exciting cause, and with rest and hygienic measures, his condition again improved. The crisis which brought the child to the hospital for the third time was definitely attributable to the psychic shock caused by the fear of an operation. Again the symptoms improved, and as conditions at the convalescent home were peaceful, the boy remained well. The father died January, 1931. Since then conditions at home have improved considerably, and the boy has remained well to the present date.

The improvement in clinical symptoms, the consistent and considerable gain in weight during the past three years are signs of recovery. The normal basal metabolic rate for more than a year, during which time the boy has been attending school and indulging in other activities, point to spontaneous arrest of the disease.

The cure of Graves disease, according to Marine (7), has been ascribed to each of 239 drugs, which subsequently were discredited. As for the efficiency of radiotherapy, Ludin (8) reviewed 208 articles from the literature on this subject, and decided that because there was such a variation in the results, it "is utterly impossible to draw conclusions, and there is nothing by which to judge future results of this form of therapy."

In the last ten years, the treatment of the condition in adults has become standardized. Most patients with Graves disease are completely and permanently relieved by appropriate surgical treatment. In the hands of experienced surgeons, the operative risk is small, and, if post-operative myedema occurs, it can easily be relieved.

In the case of children, however, standardization in treatment has progressed less rapidly. This may be explained in part by the rarity of the condition in childhood. Rankin and Priestly reviewed the results of 91 cases of thyroidectomy in children at the Mayo clinic. They observed complete relief of symptoms in 86 per cent of the cases. There were two deaths; one from post-operative pneumonia, the other from an intense hyperthyroidism following the operation. One case showed a subsequent mild hypothyroidism. In the remaining cases, there was persistence or recurrence of symptoms after thyroidectomy. Although they seem to be in favor of operative treatment even in children, these authors conclude that "the young patient with Graves disease is apparently more prone to acute exacerbations which necessitate considerable care in the pre-operative and surgical treatment if dire results are to be avoided." In view of the discouraging results reported by even enthusiastic surgeons, it seems advisable to treat this condition conservatively when it occurs before puberty.

The cause of Graves disease is still unknown. A psychogenetic factor undoubtedly plays an important rôle. That there may be involvement of the involuntary nervous system and of other endocrine glands is quite plausible (9). In the pubescent period, the endocrine glands are not static; their function changes; some now assume a leading rôle, while others become less important. While immediate surgical results seem to be good, it is nevertheless difficult to predict the effect of the prepuberty removal of the thyroid gland upon the future development of the child. Hyman and Kessel have shown that there is a marked tendency towards spontaneous recovery in most cases of Graves disease. If this is true of the static adult organism, it should apply as well to the dynamic, developing young organism, in whom regenerative and constructive tendencies are dominant. At any rate, where these young patients can be watched carefully, they should first be given the benefit of non-operative treatment.

REFERENCES

(1) Rankin, F. W., and Priestly, J. T.: Exophthalmic Goiter in Children. West. J. Surg. Obst. and Gynec., 40: 449, 1932.

(2) Shouse, S. S.: Exophthalmic Goiter in a Child Aged Five Years. Am. J. Surg., 11: 124, 1931.

(3) Kessel, L., Lieb, C. C., and Hyman, H. T.: A Study of Exophthalmic Goiter and the Involuntary Nervous System. J. A. M. A., 79: 1213, 1922; Arch. Int. Med., 31: 433, 1923.

(4) Charcot, J. M.: Leçons sur les Maladies du Système Nerveux. Ed. 1. Paris, Bourneville, 1894, I.

(5) Stern, R.: Differential Diagnose und Verlauf des Morbus Basedowii und seiner unvollkommenen Formen. Jahrb. f. Psych., 29: 179, 1908.

(6) Hyman, H. T., and Kessel, L.: Studies of Exophthalmic Goiter and the Involuntary Nervous System. Arch. Surg., 9: 149, 1924.

(7) Marine, D. (Quoted by Crile, G. W.): Surgery versus Roentgen Ray in the Treatment of Hyperthyroidism. J. A. M. A., 77, 1325, 1921.

(8) Ludin, M.: Die Behandlung der Strumen und des Morbus Basedowii mit Röntgenstrahlen. Centralbl. f. d. Grenzgeb. d. Med. u. Chir., 18: 205, 1915.

(9) DuBois, E.: Basal Metabolism in Health and Disease. Ed. 2. Philadelphia, Lea and Febiger, 1927, p. 316.

(10) Topper, A., and Mulier, H.: Basal Metabolism of Normal Children: The Puberty Reaction. Am. J. Dis. Child., 43: 327, 1932.

AMYLOID GOITER IN GENERALIZED AMYLOIDOSIS[1]

FREDERICK H. THEODORE, M.D.

[*Service of Dr. B. S. Oppenheimer*]

The case is reported because of the rarity of amyloid disease of the thyroid. The condition was recognized at necropsy as part of generalized amyloidosis which was not diagnosed clinically.

CASE REPORT

History (H. N. 361306). The patient was a male, aged 53 years, a paperhanger by occupation. Twenty-five years before admission he was suspected of having pleurisy and pulmonary tuberculosis. Though his only symptom was generalized weakness, he was sent to Denver for 6 months. Shortly thereafter he began to have paroxysmal attacks of so-called bronchial asthma, lasting 1 to 2 days. The attacks would disappear spontaneously to be followed by periods of good health. One year prior to admission to the hospital he noted a progressive enlargement of the thyroid, which was accompanied by increasing dyspnea and inspiratory stridor. There were no apparent symptoms of thyrotoxicosis. Two weeks before admission he noted some blood-streaking of the sputum. For two years he had had moderate urinary difficulty.

Physical examination. The patient was a fairly well developed and well nourished man with moderate arteriosclerosis. The thyroid was enlarged to the size of a large orange; the enlargement was most marked in the right lobe and isthmus. He was breathing with inspiratory stridor and marked expiratory wheezing. There were sibilant râles and diminished breath sounds throughout the entire chest, with limited expansion. The right pupil was larger than the left. A coarse tremor of the fingers, mainly of the left hand was present. The prostate was enlarged. The blood pressure was 148 systolic and 84 diastolic. The larynx was rotated from right to left. There was loss of mobility of the right vocal cord due to extralaryngeal pressure, while the anterior tracheal and right lateral tracheal walls showed a median bulge.

Laboratory data. The blood count was as follows: red blood cells, 3,610,000; white blood cells, 6200, polymorphonuclear neutrophils, 80 per cent. The blood Wassermann test was negative.

Blood chemistry: urea nitrogen, 57 mgm.; sugar, 87 mgm.; calcium, 7.9 mgm.; creatinin, 3 mgm.

[1] Presented before the Clinical Pathological Conference of Mount Sinai Hospital, January 24, 1934.

The sputum was persistently negative for tubercle bacilli.

Urine examinations showed constant moderate albuminuria, occasional red and white cells, but no casts. On concentration test, the maximum specific gravity was 1013. Residual urine was $\frac{1}{2}$ oz. Phenosulphophthalein excretion was 20 per cent in 4 hours.

The basal metabolic rate was plus 10 per cent.

The electrocardiogram was normal.

Roentgenograms of the chest revealed a dense shadow at the root of the ung extending down into the thorax, due to enlargement of the thyroid.

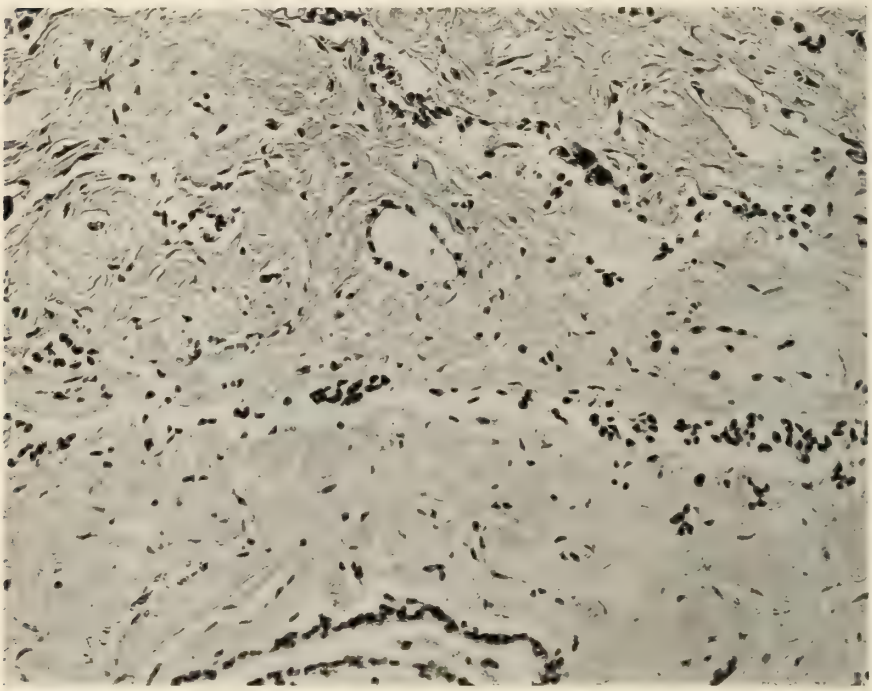


FIG. 1. Section of thyroid showing diffuse amyloid infiltration, with almost complete replacement of the parenchyma. Photomicrograph × 200, hematoxylin-eosin stain.

The thyroid appeared to encircle the trachea. The middle thirds of both lungs showed numerous small infiltrations. Their character could not be definitely ascertained. Metastatic carcinoma arising in the thyroid was considered, but its appearance was not typical. Iodized oil studies revealed slight, if any, bronchial changes. X-ray of the pelvis was negative.

Course. In view of the above data the diagnosis of carcinoma of the thyroid was considered but operative interference was deemed inadvisable by the surgeons. However, at the end of two weeks the evidence of increased tracheal obstruction, and the lack of definite proof of malignancy

caused them to withdraw their objection to operation. During this period the patient declined rapidly, and before the operation could be done he succumbed from the effects of uremia and myocardial failure. The azotemia, the fixation of specific gravity and other urinary findings pointed to the existence of primary, arteriolosclerotic, contracted kidneys.

Necropsy findings. The lungs: The lungs showed purulent bronchitis surrounded by areas of pneumonia and moderate bronchiectasis with chronic pneumonitis. There was pulmonary edema. *The heart:* The right ventricle was dilated and hypertrophied; the left ventricle was hypertrophied. *The thyroid* was greatly enlarged measuring about 16 cm. in diameter. It completely enveloped the trachea and compressed it. On section, the thyroid gland appeared glassy. Microscopic examination showed distortion of the alevolar and lobular structure by diffuse deposition of amyloid about the acini and vessels with resultant atrophy and degeneration of the epithelium, (fig. 1). *The kidneys* were irregularly contracted and resembled those usually associated with vascular disease. Histologically there was seen in addition to the irregular and diffuse deposition of amyloid in the glomeruli, stroma and in the adventitia of the renal vessels, a moderately extensive arteriolosclerosis.

The remainder of the organs, including the heart, liver, spleen, pancreas, intestine, lymph nodes, testes, bone marrow, prostate, and particularly the adrenals, all showed considerable amyloid deposition. Special stains including methyl-violet and Congo red were positive for amyloid.

COMMENT

The case illustrates the development of generalized amyloidosis after long standing pulmonary suppuration. It is unusual in that the thyroid was so extensively involved as to simulate malignant disease and to suggest operative intervention because of pressure symptoms. Had the renal insufficiency and persistent albuminuria been correctly interpreted and generalized amyloidosis demonstrated by the Bennhold test, the diagnosis of amyloid goiter could have been made. Adrenal insufficiency may have been responsible for the relatively low blood pressure and increasing debility.

The thyroid is often involved in generalized amyloidosis, but the degree of involvement is usually slight and only found on microscopic examination. Enlargement of the thyroid due to the deposition of amyloid is, however, rare. Probably not more than thirty cases have been recorded in the literature. Of these several need not be included in the present discussion because they represent merely local changes in tumors. Among the latter is included the often quoted case of Stoffel as well as those of Van Burck and Von Jaquet. There appear to be only seven cases on record in which there was sufficient enlargement of the thyroid to be noted clinically. The first is described by Von Eiselsberg (1), whose patient with

bronchitis and tetany was thought to have a carcinoma, the true nature of the enlargement being discovered at operation. Schilder (2) described a man with a goiter the size of a man's head, considered malignant. Post mortem examination disclosed generalized amyloidosis with extreme involvement of the thyroid gland secondary to pulmonary tuberculosis and bronchiectasis. Wegelin (3) describes two cases. One was a man with bronchitis and emphysema operated upon for a carcinoma of the thyroid. The other was a woman who died before operation could be performed for a presumed thyroid malignancy. Autopsy revealed an amyloid goiter, secondary to bronchiectasis and putrid bronchitis. Oberling's (4) case was different from the others in that at autopsy the amyloid was found only in the thyroid. It, too, simulated a neoplasm. Hunter and Seabrook (5) reported a tuberculous patient with a goiter who was operated upon for pressure symptoms and amyloid was found in the thyroid. A post-operative Congo red test showed only 22 per cent retention. The case was quite similar to that of Toland and Kroger (6) which post-operatively revealed Congo red retention of 34 per cent. In neither case were preoperative studies of Congo red retention made since amyloidosis was not suspected. In none of the cited cases were symptoms of hypothyroidism noted.

Though amyloid goiter is a rare condition the case here described and the other cases cited illustrate that the condition is more than of academic interest. It gives rise to tracheal obstruction and laryngeal paralysis and can completely simulate a malignant neoplasm. Therefore, in cases of an enlargement of the thyroid where in addition a cause for generalized amyloidosis exists, the possibility of an amyloid goiter should be considered.

REFERENCES

(1) Von Eiselsberg, F.: Ein Fall von Amyloid Kropf. Arch. f. Klin. Chir., 73: 649, 1904.

(2) Schilder, P.: Ueber einige weniger bekannte Lokalizationen der amyloiden Degeneration. Beiträge fur Path. Anat., 46: 619, 1909.

(3) Wegelin, C.: Schilddruse, Henke-Lubarsch, Handbuch der Pathologie. Ed. 1. Berlin, Julius Springer, 1926, Vol. VIII: 94.

(4) Oberling, C.: Amyloid Goitre. Ann. d'anat. path., 4: 125, 1927.

(5) Hunter, W. C., and Seabrook, D. B.: Goitrous Enlargement of Thyroid Gland due to Amyloidosis. Arch. Surg., 20: 762, 1930.

(6) Toland, C. G., and Kroger, W. P.: Amyloid Goiter in Amyloidosis. West. J. Surg., 39: 372, 1931.

HYPERTROPHIC JEJUNO-ILEITIS—TUBERCULOUS OR NON-SPECIFIC?[1]

I. SCOTTY SCHAPIRO, M.D.

[*Services of Dr. B. S. Oppenheimer and A. A. Berg*]

The case is presented because of the unusual and the obscure character of the lesion. The clinical manifestations and the roentgenological investigations indicated the diagnosis of a non-specific hypertrophic jejuno-ileitis. This seemed to have been substantiated by the findings at the operation as well as by the gross pathological studies. Microscopic studies, however, revealed well defined anatomical tubercles confined entirely to the mesenteric lymph nodes of the region involved. The presence of these tubercles in the nodes only and their absence in the lesion raised the question of a primary intestinal tuberculosis.

CASE REPORT

History (H. N. 358315). The patient, a white male, 30 years old, entered the hospital October 18, 1933. His family and past history were negative. His illness began six years prior to admission to the hospital with mild lower abdominal cramps, not associated with the intake of food. Three months later diarrhea developed with from four to seven daily loose, watery, non-bloody, bowel movements. Simultaneously his temperature became elevated and rose often as high as 104°. He lost thirty pounds in weight. A gastro-intestinal X-ray series taken at this time showed increased intestinal peristalsis. The diagnosis of enteritis was made and the patient was sent to a sanatorium. There roentgenologic examinations of the chest, repeated sputum examinations, animal inoculations of the sputum, feces and pus from an ischio-rectal abscess revealed no evidence of tuberculosis. Under symptomatic treatment the diarrhea and fever gradually subsided and the lost weight was regained. This period of diarrhea lasted altogether seven months. Shortly after the cessation of the enteritic symptoms the patient began to have almost daily brief sharp attacks of lower abdominal cramps, and, at longer intervals, severer attacks of pain and abdominal tenderness. The latter were accompanied by fever and nausea and an occasional episode of mild diarrhea, consisting of three to four stools, but lasting only a few days. During one of the severer attacks of abdominal pain there were tenderness and rigidity of the right lower quadrant. The picture was not unlike that of acute appendicitis.

[1] Presented before the Clinical Conference of Mount Sinai Hospital, November 24, 1933.

After four years of illness the patient was referred to the consultation clinic of the Mount Sinai Hospital. There an examination of the gastrointestinal tract by means of a barium meal showed a stenotic segment of bowel, of either the lower jejunum or the upper ileum about two feet in



FIG. 1. Roentgenogram showing stenosed and ulcerated lesion with arrows pointing to the involved distal jejunum and proximal ileum; barium given through duodenal tube.

length. The nature of the lesion, however, could not be established. He was given symptomatic treatment for a period of one year without beneficial effects. He was then admitted to the hospital for further study with a view to determine whether the lesion was sufficiently discrete to permit successful operative intervention.

Examination. The general physical status of the patient on admission was essentially negative. There was only slight tenderness in the right lower quadrant.

Laboratory. The stool showed a positive guaiac test but no other significant findings. A roentgenologic series of the small intestines with the introduction of barium directly into the duodenum by means of a duodenal bucket disclosed a lesion confined solely to a segment of small intestine, situated in the distal portion of the jejunum and the upper ileum, corroborating the previous X-ray finding.

Course. A laparotomy revealed three feet of diseased terminal jejunum and upper ileum. The diseased intestine was resected and a side-to-side anastomosis was performed. The patient made an uneventful recovery.

Pathological examination of the resected specimen showed a chronic cicatricial and polypoid hyperplastic enteritis. The entire wall of the resected portion of the intestinal tract was markedly thickened. The mucosa was hypertrophied, presenting small polypoid masses which, in some areas were arranged in longitudinal rows and ridges. The latter together with intervening scarred tissue gave the lumen of intestine a cobble stone appearance. The mesentery was thickened and fibrotic; it contained numerous hyperplastic lymph nodes. Microscopically, the intestinal wall showed marked hyperplastic and exudative inflammatory changes and contained an occasional giant cell. No definite anatomical tubercles were noted. The enlarged regional lymph nodes, however, showed numerous well defined anatomical tubercles. No tubercle bacilli were found in the walls of the intestinal tract or in the nodes.

COMMENT

The clinical course and the surgical findings showed evidence, then, of a hypertrophic non-specific enteritis in the intestinal wall, while the lymph nodes in the involved region revealed a tuberculous process.

The case illustrates the difficulties which are encountered in the diagnosis of chronic inflammatory disease of the small intestines. These difficulties are caused by the variability in the site of the lesions and the consequent manifold manifestations. The first symptoms may be those of an ulcerative enteritis, consisting of diarrhea, fever, and loss of weight. As the inflammatory process continues and the chronic cicatricial process with stenosis takes place, symptoms of a chronic incomplete intestinal obstruction (abdominal cramp-like pain and borborygmus) arise. At times, these abdominal pains are associated with fever, vomiting, and right lower quadrant tenderness and rigidity. The picture may simulate in many respects attacks of acute appendicitis, frequently leading to operative interference. All too frequently in investigation of obscure chronic abdominal conditions the attention is focused upon the stomach and colon.

In cases where investigation of these organs is negative a careful serial X-ray examination of the small intestine may reveal an unexpected lesion.

The pathologic character of the lesion is of considerable interest. Two divergent views are held as to its causation. One view is that the condition in the intestines and nodes are both due to tuberculosis; the other, that the intestinal lesion is of a non-specific character and that the diminished resistance of the diseased gut due to infection and ulceration has allowed the passage of tubercle bacilli through the intestinal wall, and so accidentally involved the regional lymph nodes. Against the latter contention is the fact that there are numerous cases of non-specific infection of the small intestine in which the resected specimen shows no evidence of tuberculosis in the regional nodes. Such cases usually show little changes in the lymph nodes. The giant cells which are seen in the wall of the intestinal tract are most likely due to the constant irritation by foreign bodies. The lymph nodes in this case were so rich in typical anatomical tubercles that it would be difficult to ascribe the lesion to anything but a tuberculous infection. It may thus be assumed that in this instance we have a rare case of primary tuberculosis of the small intestine, localized to the jejunum and adjacent upper ileum.

REFERENCES

Crohn, B., Ginzberg, L., and Oppenheimer, G. D.: Regional Ileitis. J. A. M. A., 99: 1232, 1932.

Ginzberg, L., and Oppenheimer, G. D.: Non-Specific Granulomata of the Intestines. Ann. Surg., 98: 1046, 1933.

Harris, F. I., Bell, G. H., and Brunn, H.: Chronic Cicatrizing Enteritis. Surg. Gynec. and Obst., 57: 637, 1933.

Mock, H. E.: Infectious Granuloma. Surg., Gynec. and Obst., 52: 637, 1931.

Moschcowitz, E., and Wilensky, A. O.: Specific Granulomata of the Intestines. Am. J. M. Sc., 48: 166, 1923.

SUBPHRENIC ABSCESS SECONDARY TO UNRECOGNIZED PERFORATION OF THE GALL BLADDER

DAVID BECK, M.D.

[*Service of Dr. B. S. Oppenheimer*]

In about 5 per cent of cases, the cause of a subphrenic abscess is the spread of infection from a diseased gall bladder before or after cholecystectomy. Rarely, the cause is a perforation of a gallbladder clinically "silent," or attended only by the recurrence of the symptoms which have characterized previous attacks, so that the perforation is unrecognized and untreated surgically.

In many, if not in most instances, the right posterior subphrenic space is involved. The percussion signs and ausculatory evidence of an elevated diaphragm and a compressed lower pulmonary lobe are therefore most apt to be detected on the posterior chest wall. They may not be observed when a "sympathetic" or "cloak" pleural effusion (Mantel Erguss) is present. Occasionally the clinical picture is that of a well developed right subphrenic abscess, which may have reached some degree of "pointing" on the chest wall. The history may suggest that it has existed for weeks or months; and there may have been repeated attacks of gall-stone colic, varying greatly in intensity and duration and in the accompanying symptoms such as chills, fever or jaundice. Again, the clinical course may be characterized by continuous mild symptoms of a gastric disorder such as those commonly seen in chronic disease of the gall bladder. Freedom from any of the above symptoms may sometimes leave the origin of the abscess unexplained.

X-ray examination of the chest will show a subphrenic collection of fluid. If there is doubt as to the location of this accumulation, whether infrapulmonary or sub-diaphragmatic, a "pneumoperitoneum" may demonstrate the abscence of air under the right leaf of the diaphragm and thus establish the true location of the fluid. X-ray examination of the gall bladder may show stones within or without the organ and a Graham dye concentration test may occasionally show the filled gall bladder with an irregular outline suggesting a thickened, chronically inflamed organ. If the cystic duct is closed, there will naturally be no visualization.

At operation, the unsuspected source of the abscess may be recognized by the presence of bile stained pus and occasionally by finding gall stones or biliary debris. The presence of bile indicates a patent cystic duct. If the duct is closed, the abscess cavity contains a highly mucoid, bile-free fluid secreted by the gall bladder, and likely to be sterile. The absence

of organisms may explain the occasional symptomless accumulation of huge amounts of fluid, even to the extent of 4 to 5 liters, as was noted in one instance where the liver was pushed down below the level of the umbilicus. A high content of bile, because of its bactericidal property may account for a sterile fluid in other instances. In the infected cases, B coli are found most commonly. Rapidly forming adhesions seem to explain the absence of bile peritonitis.

Incision and drainage alone will not cure these abscesses. A post-operative sinus leading to the abscess cavity may drain for months, apparently because it receives the secretion from the intact mucous membrane of the gall bladder which may or may not communicate with the biliary passages. To effect a cure a secondary cholecystectomy must be done.

CASE REPORT

History (H. N. 349199). A woman of 46, a multipara, was admitted to the hospital on February 20, 1933. A left nephrectomy had been performed six years previously for calculus pyonephrosis. Roentgenograms at that time showed the presence of stones in the right kidney as well. Following the nephrectomy, she was well until six months ago. At this time she experienced her first sharp attack of cramp-like pain, occurring in the epigastric and umbilical regions, coming on after a meal and associated with a sense of extreme fullness relieved by vomiting. The pain shifted to the right upper quadrant and remained there for about twenty-four hours. After this attack she felt well until three months before admission when she had a similar one lasting for four days and again associated with vomiting.

Four weeks before coming to the hospital there was another recurrence, the pain radiating for the first time to the scapular region. At no time did she have chills, fever or jaundice. From the time of this last attack until admission, she had had an intermittent dull ache in the right upper quadrant, radiating around to the lumbar region. There were, however, no urinary symptoms.

Physical examination. The patient was a well nourished woman, moderately pale. At times she seemed to be uncomfortable, referring to the right upper quadrant as the area which caused her distress. Examination of the chest showed dullness at the right base, with diminished breath sounds and a few râles almost to the angle of the scapula. In the axilla, however, the resonance and breath sounds were good. The liver edge was palpable one inch below the free border, and under it could be felt an irregularly rounded, firm, tender mass. Because of the patient's adiposity it could not be definitely determined as gall bladder or kidney. There was a left nephrectomy scar. The blood pressure was 120 systolic and 80 diastolic. The urine contained 2 plus albumin, with a few pus cells, but no casts. The white cell count averaged 14,000 with 85 per cent poly-

morphonuclears. The temperature fluctuated continuously around 101. The blood chemistry was normal, and tests proved good kidney function. The chest X-ray showed an elevated right diaphragm, being two intercostal spaces above the left. Roentgenograms of the right kidney failed to show the stones previously mentioned. The gall bladder, by the dye test, did not visualize. Pneumoperitoneum showed the failure of air to enter between the right leaf of the diaphragm and the upper surface of the liver, although this distinctly occurred on the left side.

Course. The patient was operated upon by Dr. Colp. As the right subphrenic space was opened, a large amount of bile-stained, muco-purulent material escaped which on culture showed B. coli. The amount of drainage diminished steadily. One week before discharge the patient experienced another attack of gall-stone colic, lasting one hour. The temperature rose to 102 during the course of the day.

The patient was discharged with a draining sinus about $1\frac{1}{2}$ inches in diameter, which on sodium iodide injection, was shown to enter a large irregular abscess cavity in the subphrenic space. The sinus closed in four weeks. During the four weeks following discharge, there were several mild attacks of pain in the gall bladder region, about a week apart, without chills or jaundice.

Two months later the patient was readmitted to the hospital for removal of the diseased gall bladder. Her general condition was good. The gall bladder seemed palpable, and there was no tenderness over the liver on palpation or percussion. At operation the "palpability" of the gall bladder was found to be due to adherent omentum. The gall bladder was also adherent to the colon and to the duodenum. In its mid-portion there was an area of adhesions which was the site of a perforation. The wall was considerably thickened and inflamed, and the cavity contained a single large stone. The right subphrenic space was walled off by adhesions.

The post-operative course was uneventful. A roentgenogram of the chest, before her discharge from the hospital showed the right diaphragm to be normal in position and mobility. The patient when seen six months later was free of symptoms.

REFERENCES

Musser, J. H.: Etiology and Diagnosis of Suppuration in and About the Liver. New Orleans M. and S. J., 82: 745, 1930.

Ochsner, A.: Subphrenic Abscess. New Orleans M. and S. J. 81: 102, 1928.

Overholt, R. H.: Silent Rupture of Gall Bladder Producing Diaphragmatic Abscess. Surg. Clin. N. Am., 12: 611, 1932.

RECTAL BLASTOMYCOSIS

GORDON D. OPPENHEIMER, M.D.

[*From the Surgical Service of Dr. Edwin Beer*]

A localized blastomycotic infection of the rectum unassociated with signs or symptoms of blastomycosis higher up in the intestinal tract or elsewhere in the body is an unusual condition. In the case here reported the diagnosis at first was obscured by the resemblance of the clinical picture to that of carcinoma of the rectum.

CASE REPORT

History (H. N. 352911). An Italian laborer, 38 years of age, was admitted to the surgical service on June 3, 1933, complaining of bleeding from the rectum for five days. Fifteen years previously he had blood streaked stools for two weeks which were attributed to hemorrhoids. During the last ten years he has bled similiarly for a short period of time at intervals of three to six months. Five years ago the patient suffered from symptoms of indigestion. A gastro-intestinal X-ray series at that time was interpreted as being suspicious of a duodenal ulcer. Six months prior to his admission and following a tonsillectomy he began to complain of weakness, vertigo, pallor and slight loss in weight. Two months later an exploratory laporatomy was carried out at another institution and the stomach was found ptosed, but no disease of the viscera was noted. The appendix was removed. It was found to be normal, grossly and microscopically. More recently he developed marked frequency and urgency of defecation, tenesmus, and blood streaked stools. In the belief that his symptoms were caused by hemorrhoids his physician gave him two injections for "hemorrhoids." There was no relief and symptoms became more severe with loss of a large quantity of blood per rectum.

Physical examination. The patient was a pale, well nourished, well developed man. Rectal palpation and proctoscopic examination revealed a firm, ulcerated mass occupying the right lateral wall of the rectum, extending to the midline posteriorly and down to about 2 cm. from the anal muco-cutaneous junction. It measured approximately 8 by 5 by 5 cm. Its crater-like central ulceration was surrounded by raised, overhanging hard edges. The appearance seemed to be fairly typical of an adenocarcinoma.

The patient was afebrile; his blood pressure was 106 systolic and 76 diastolic. The urine was negative. The hemoglobin was 76 per cent and the red blood count was 3,500,000. The blood Wassermann and Kahn

tests were negative. A Frei test was negative. X-ray examination of the chest and spine were negative.

Course. A punch biopsy was performed, following which the patient had a very severe hemorrhage. This was controlled with some difficulty. Transfusion was given. At the request of the department of pathology a second biopsy was performed. Both were reported as follows. "Rectal tissue: Granulomatous lesion chiefly submucous with peculiar inclusions, suggestive of blastomyces." A third biopsy was then performed and a piece of tissue was sent to the laboratory for bacteriological examination. The bacteriologist reported the identification of blastomyces hominis in the material. His examination was made on direct spreads as well as on smears of crushings stained by the gram method. A fungus was found. The fungus was implanted on Sabouraud's media and the blastomyces grew. Transplantation kept the fungus alive for several generations. Gram stains of smears obtained from the cultures showed the yeast cells to be large, with the darkly staining blue border surrounding the highly refractile, faintly pink, substance of the cell body.

With the diagnosis of blastomycosis thus established, the patient was put on large doses of potassium iodide and subjected to radiotherapy. A week later, the mass was found to be distinctly smaller. There was progressive improvement.

He was discharged on July 4, 1933, and continued to receive iodides for three months. He was also given 6 deep X-ray treatments and 8 neosalvarsan injections. On October 7, 1933 a rectal examination revealed a raised cicatrix at the site of the original lesion. On December 12, 1933, there was only slight thickening of the rectum in the location of the previous granuloma. The patient's general condition was markedly improved, although he still complained of vague abdominal symptoms without detectable objective signs. He is still under observation in the Follow-up Clinic of the hospital.

COMMENT

Blastomycosis is the term given to the pathological conditions provoked by an infection with any of several closely related fungi. They are yeast-like, and in tissues are seen as oval or round cells. They were originally described by Wernicke in 1890 and by Gilchrist in 1894 as the cause of certain wart-like skin eruptions.

There are generalized and local forms of blastomycosis. The former types have a varying symptomatology which depends on the dominant location of the disease. The portal of entry is often through the pulmonary system. Any organ may be involved. Many cases with a small primary lesion show multiple widely disseminated metastatic lesions, as in a pyemia. The localized forms are usually oral, cutaneous or gluteal. Recently, however, a case of primary rectal blastomycosis in a 21 year old

laborer was reported by Sodre and Cerutti. The disease in any location is extremely chronic, rarely healing spontaneously, and often terminating fatally. For this reason, while the patient here presented has been well now for six months, the permanency of the cure in this patient is still somewhat uncertain.

REFERENCES

Sodre, De Azevedo, L., and Cerutti, H.: Rectite Blastomycosica. Bol. Soc. de med. e cir. Sao Paulo, 14, No. 4: 167, 1930.

Castellani, A., and Chalmers, A. J.: Manual of Tropical Medicine. Ed. 3. London Baillière, Tindall and Cox, 1919.

Raiford, T. S.: Systemic Blastomycosis with Report of a Case. Bull. John Hopkins Hosp., 51: 61, 1932.

CHRONIC SUBDURAL HEMATOMA[1]

ABRAHAM KAPLAN, M.D.

[*Services of Dr. I. Strauss and Dr. I. Cohen*]

For the past two decades the diagnosis of chronic subdural hematoma has been made not only with increasing frequency but sufficiently early in many cases so that surgical intervention has been more prompt and the recoveries more numerous. The publications of Trotter (1), Putnam and Cushing (2), Jelsma (3), and Kaplan (4), on this subject have clearly emphasized this clinical entity, and have stressed its high incidence. During the past fifteen months we have had six such cases at the Mount Sinai Hospital.

CASE REPORT

History (H. N. 357262). An Italian college student, aged 19, entered the hospital on October 1, 1933, complaining of headaches of three weeks' duration. He was perfectly well until one month before admission when he experienced severe frontal headache while drilling in the hot sun in the south. The following morning he was sufficiently well to return to his regular duties, but four days later, during drill, the headache returned and persisted. It was associated with the vomiting of medication on two separate occasions. He was taken to the college infirmary where on the second day he became unconscious and fell out of bed. Upon regaining consciousness he began to have generalized dull headache and then to see double. He also noted numbness of the fingers of the left hand. Because of some stiffness of the neck a lumbar puncture was done which showed normal fluid under markedly increased pressure, and following this procedure his headache diminished. Vision in the right eye, however, soon began to fail; he noted tingling sensations in the face and both hands and an early papilledema was observed on the right. Lumbar puncture was repeated with complete disappearance of headache, but this had no influence on the advancing papilledema. There was no somnolence, dizzy spells, convulsions, or disturbance of speech. His mental processes seemed to be slightly retarded. He was sent home with a diagnosis of cerebral neoplasm.

Examination. The patient was an alert coöperative young man who gave a clear and consistent account of his illness. The positive neurological findings were: (1) the right pupil slightly larger than the left, (2) bilateral

[1] Presented before the Clinical Conference of the Mt. Sinai Hospital, January 26, 1934.

papilledema, 4 diopters elevation on the left, and 3 diopters elevation on the right, (3) bilateral external rectus paralysis, (4) slight right facial weakness, (5) stiffness of the neck and bilateral Kernig sign, (6) depressed deep reflexes, (7) active abdominal responses, and (8) bilateral Babinski sign.

Laboratory findings. Urine and blood studies were negative; the blood pressure was 136 systolic and 90 diastolic. Cerebrospinal fluid was clear, showed a pressure of 280 mm. with five cells and a negative Wassermann reaction.



Fig. 1. Fragments of the chronic subdural hematoma

Course. Repeated questioning about the fall out of bed did not convince the staff of its etiologic relationship to the illness, and the service was inclined toward the diagnosis of a neoplasm, either of the posterior fossa or in the brain stem.

The patient's condition remained unchanged for ten days. He then began to show weakness of the left leg and the following day weakness of the left arm. In addition there was subjective numbness of these parts

but no sensory disturbance could be established. A ventriculography was then carried out for the purpose of localization and it was during this procedure that a hematoma was disclosed. On October 1, 1933, a trephine over the left hemisphere brought to view a grayish dura under moderate tension. When the dura was opened, there was a profuse gush of dark brownish blood, 30 cc. in all, which spurted with each pulsation of the brain. Upon further investigation some shaggy membrane was removed through the trephine which established the diagnosis of chronic subdural hematoma. During this procedure it was noted that the left external rectus paralysis completely disappeared. Knowing the frequency with which this lesion is bilateral, another trephine was made over the right hemisphere which appeared normal.

Two days later the patient's temperature rose. He spat some blood streaked sputum and for thirteen days was ill with a mild form of bronchopneumonia. His left hemiparesis disappeared within five days after the trephine exploration.

On November 14, 1933, craniotomy was again performed and a large flap was turned down on the left side, exposing a well organized hematoma covering the entire left hemisphere. It was greyish brown, lens shaped, tapering off to meet the arachnoid at the periphery, and firmly adherent to the dura but not to the arachnoid. It was so large that it had to be removed in three pieces (fig. 1). As one-half of the hematoma was raised a cortical vein could be seen running into the under surface of the hematoma, probably the source of the venous bleeding. This was clamped and severed.

On the day following the craniotomy there was a mild sensory aphasia, and on the next day he suddenly complained of headache, became more aphasic and drowsy, and developed weakness of the right arm. Several ounces of dark blood were aspirated from beneath the wound resulting in prompt improvement in the above signs. Dakin tubes were left in place for the escape of further bleeding. Several days later he showed evidence of wound infection which was fortunately brought under control.

Upon discharge on December 12, 1933 he was completely well.

COMMENT BY DR. ISRAEL STRAUSS

1. It is noted in this case that the hemiparesis was upon the side of the hematoma. This is not an unusual finding in these cases. It is probably due to the fact that the hematoma, as a rule, extends from the frontal to the occipital pole and by compressing the hemisphere it presses the opposite crus cerebri against the tentorium and in that way causes the paralysis upon the same side as the hematoma. This pressure has been demonstrated in brains that have come to autopsy and a definite notch in the crus has been found in these patients.

2. The patient, a Northern boy unaccustomed to the outdoor heat,

undoubtedly suffered from insolation. At the time he drilled the temperature was 101°F. The severe headache, vomiting and unconsciousness are are not infrequent symptoms in insolations. Although there was a history of a fall out of bed, and although the symptoms of increased intracranial pressure came on rapidly following the fall, the neurological staff did not appreciate the significance of the clinical picture. The marked bilateral involvement of the eye muscles, together with the transient hemiparesis, despite the presence of papilledema and marked increased pressure of the cerebrospinal fluid should have made us think of a condition other than neoplasm.

3. The case described shows the difficulties in making a diagnosis of chronic subdural hematoma even when one is suspicious of such a lesion. In many instances the diagnosis is made only after trephine operation.

4. The great majority of cases of subdural hematoma, when diagnosed and operated upon, either by merely trephining or by the removal of membrane make an uneventful recovery.

REFERENCES

(1) Trotter, W.: Chronic Subdural Hemorrhage of Traumatic Origin and Its Relation to Pachymeningitis Hemorrhagica Interna. Brit. J. Surg., 2: 271, 1914.

(2) Putnam, T., and Cushing, H.: Chronic Subdural Hematoma. Arch. Surg., 11: 329, 1925.

(3) Jelsma, F.: Chronic Subdural Hematoma; Summary and Analysis of Forty-two Cases Collected from the Literature, With the Report of Two Additional Cases. Arch. Surg., 21: 128, 1930.

(4) Kaplan, A.: Chronic Subdural Hematoma: A study of 8 Cases with Special Reference to the State of the Pupil. Brain, 54: 420, 1931.

ROENTGEN DIAGNOSIS OF TUBAL PREGNANCY

ARTHUR J. BENDICK, M.D.

[*Services of Drs. L. Jaches and R. T. Frank*]

Roentgenologic examination of the female genital tract following the injection of opaque material through the os is not new. Rubin (1) in 1915 injected collargol solutions. Later, as lipiodol (2) became popular for this procedure, Rubin and Bendick (3) reported a large series of cases studied by this method.

In the case to be described the roentgenologic examination made possible an absolute differentiation between a uterine and an ectopic pregnancy.

CASE REPORT

History (H. N. 362014). The patient, a white married woman, 26 years of age, and weighing 180 pounds, was admitted to the hospital, January 27, 1934. She had had one miscarriage, and no children. Her last menstrual period occurred on July 10, 1933. During the latter part of July she complained of some nausea. In August she noticed that her breasts were enlarging, and in November she felt fetal life. Late in November she experienced two profuse vaginal hemorrhages. Two weeks before admission to the hospital she was suddenly seized with an attack of very severe pain in her abdomen radiating to her left shoulder. Following this attack she no longer felt life.

Physical examination. The cervix was small and closed. A central mass, the size of a four months gravidity reaching to the umbilicus could be felt in the pelvis. Another mass of a cystic consistence, about the size of an orange could be felt in the left fornix. Roentgenologic examination showed a fetus in the pelvis about the size of a four and one-half months pregnancy (fig. 1).

Diagnosis. It was essential to differentiate between an intra-uterine pregnancy associated with a cystic left ovary, and an extra-uterine pregnancy, with the uterus retaining its normal size and displaced to the left. To do so a roentgenologic examination preceded by the injection of iodized oil into the uterus was decided upon. This showed the uterus to be normal in size but displaced to the left (fig. 2). The left tube appeared filled with iodized oil to the fimbria. The right tube showed that the isthmus filled readily; the ampulla was filled at the proximal end and was then seen dilating into a large mass containing the fetus. This was interpreted as indicating an ectopic pregnancy with the fetus in the ampulla of the right tube.

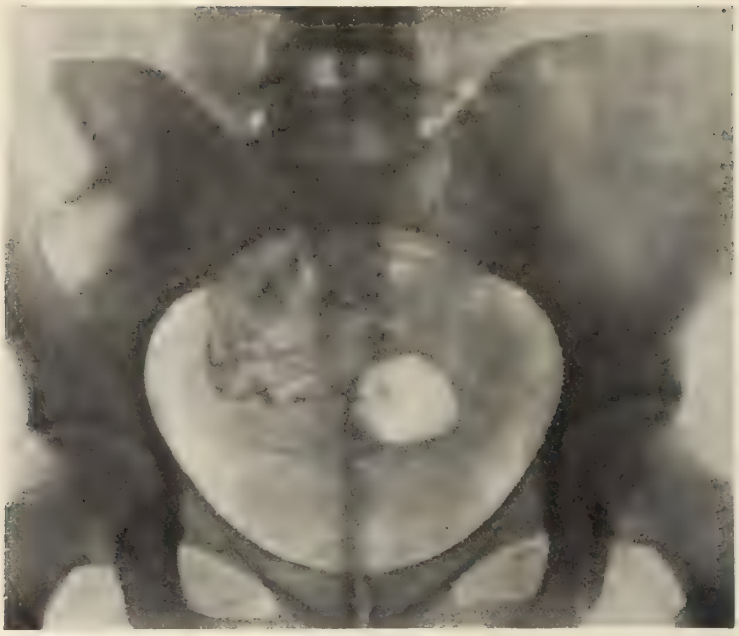


FIG. 1. Roentgenogram showing fetus in the pelvis



FIG. 2. Roentgenogram of pelvis, following the injection of lipoidol

At laporatomy the left adnexa were found enlarged and cystic. On the right side a large tubo-ovarian mass containing a fetus was found. The right tube was thickened and incorporated in the mass. A bilateral salpingo-oophorectomy was performed. The convalescence was uneventful.

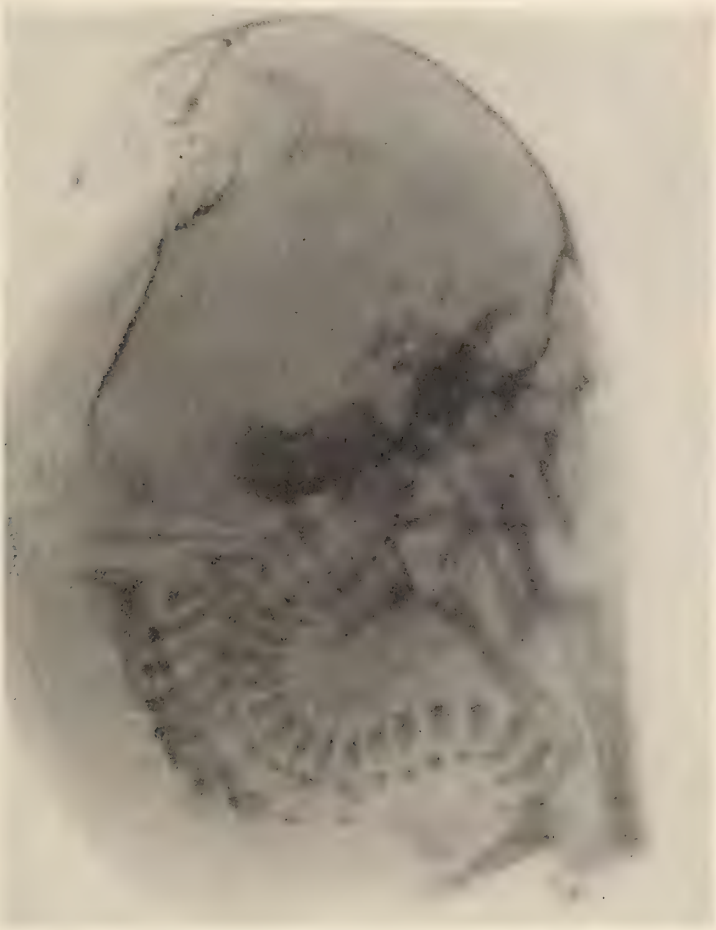


FIG. 3. X-ray of fetus following post operative removal

REFERENCES

(1) RUBIN, I. C.: X-ray Diagnosis in Gynecology with the Air of Intrauterine Collargol Injection. Surg., Gynec. and Obst., 20: 435, 1915.

(2) FORESTIER, J.: Iodized Oil (Lipiodol in Roentgenology). Am. J. Roentgenol., 15: 352, 1926.

(3) RUBIN, I. C., AND BENDICK, A. J.: Uterotubal Roentgenography with Lipoidol. Am. J. Roentgenol., 16: 251, 1926.

A CASE OF UNUNITED INFECTED FRACTURE: HEALED WITH THE AID OF MAGGOT TREATMENT[1]

ROBERT K. LIPPMANN, M.D.

[*Service of Dr. P. W. Nathan*]

The case is one of an ununited fracture of the femur of twenty-eight months' duration, complicated by hematogenous staphylococcus albus osteomyelitis in the fracture area. Healing of the osteomyelitis as well as of the fracture followed debridement and an eight weeks course of maggot therapy. The patient now suffers only from shortening of the extremity and limitation of flexion at the knee joint.

CASE REPORT

History (Out-patient department No. 18114). A white male, age 42, a truckdriver, sustained a simple fracture of the shaft of the left femur in February, 1930, as the result of a traffic accident. He was taken to nearby hospital where he was treated by pin traction for nine weeks, following which, because of non-union, a plaster cast was applied. Four months later the plaster cast was removed. The fracture was still ununited and a brace was applied. This was worn for ten months without effect upon the fracture.

In April, 1931, an operation, presumably of the bone graft type, was attempted. The incision for this procedure was made, but as pus was encountered in the superficial muscle layers the operation was discontinued. Drainage was instituted instead, and the wound healed rapidly closing in two weeks.

Two months later, in June, 1931, the patient was admitted to the Montefiore Hospital where a second operation was performed. The fracture site was exposed. No evidence of active infection was encountered. The bone ends were freshened, a Lane plate inserted, and a plaster spica applied. However, the wound broke down and drainage was instituted one week after the operation. A seropurulent discharge continued for two months. At this time X-ray revealed that the Lane plate had become loose. It was then removed and the wound closed with provision for drainage. Healing was sluggish, and was followed by recurrent fistulae which opened, discharged quantities of sero-purulent material, and then closed again.

[1] Presented before the Clinical Conference, January 27, 1933. From the out-patient department of Mt. Sinai Hospital.

In June, 1932, one year after the Lane operation, the patient reëntered Montefiore Hospital with a large abscess of the thigh at the fracture site and with a temperature of 103°. A fourth operation was then undertaken. The fracture site was widely exposed by excising the scar of the previous incision. A few small sequestra were removed and the bone ends were again freshened. The wound was packed with vaseline gauze and a plaster spica applied for immobilization. Cultures of the pus showed staphylococcus albus. One week later, the vaseline pack was removed and maggot therapy instituted. Fresh maggots were inserted into the wound at weekly intervals for eight weeks. Nine weeks later the wound was healed and the patient was allowed to walk with a brace for another two months. The fracture was then healed and the brace was discarded. For the past few months the patient has increasing use of the extremity, and at the present time suffers only from limited flexion of the knee joint (110°), the result of scarring of the quadriceps muscle, and from three inches of shortening.

Inasmuch as bony union promptly followed the clearing up of the local infection, it is likely that failure of the fracture to unite was due to an avirulent hematogenous osteomyelitis at the site of the fracture. However, it is also possible that through some mechanism, as yet unknown, the maggots directly stimulated osteogenesis. The mechanism by which maggots function in osteomyelitis is still not understood. The various theories that have been suggested may be gathered from the literature which is extensive.

REFERENCES

(1) Baer, W. S.: Treatment of Chronic Osteomyelitis with the Maggot. J. Bone and Joint Surg., 13: 348, 1931.

(2) Goldstein, H. T.: Maggots in the Treatment of Wounds. J. A. M. A., 96: 290, 1931.

Walter James Highman
1879-1934

On January 24, 1934 Dr. Walter James Highman died from a cerebral hemorrhage.

Dr. Highman was born in New York City and received his Bachelor's Degree from Columbia University in 1901, he then attended the College of Physicians and Surgeons and was graduated in 1905. He served two and one-half years as interne at the Mount Sinai Hospital. Greatly influenced by the genial and well remembered Dr. Lustgarten, he decided to take up dermatology as a speciality. He studied at Berlin, Freiburg, Paris, Vienna and Bern for a period of two years.

The skin to him, was like the cover of a book which revealed only the title of the struggles and conflicts contained within its pages. In his practice of dermatology, he never neglected his internal medicine and endocrinology, and he mastered to an amazing degree the intricacies of the sympathetic nervous system.

When he returned from Europe he became affiliated with the Mount Sinai, Lenox Hill and Lebanon Hospitals. Scientific research was just as important to him as his clinical practice, and he devoted himself to both with fervor and assiduity. He made several trips abroad to substantiate and supplement his knowledge obtained at home.

Dr. Highman's genius and ability were recognized quite early in his life; at various times, he taught dermatology at the Cornell Medical School, at the College of Physicians and Surgeons and the New York Post Graduate Hospital. He was also clinical professor at the New York University Medical School. He never took anything for granted, but submitted every problem that haunted his phantasy to most rigid and scrupulous scientific reconsideration.

Dr. Highman wrote a number of books and about seventy articles which covered practically every branch of dermatology and interrelated medicine. He wrote fluently, intelligently, honestly and with an enviable literary style. He had a tremendous gift of vocabulary and facility of expression, tinctured with a fine sense of humor and delightful clarity. He loved art for art's sake, even as he loved science for its stern factual realities.

Notwithstanding a physical handicap, Dr. Highman served as a Major during the World War. He had always been a prominent member of many national and local dermatological societies, frequently having been vested with office. He was chairman of the Section of Dermatology of the American Medical Association in 1920. In his specialty, Dr. Highman was

always a brilliant and constructive contributor; he spoke with ease and charm, with wide knowledge and finality.

In practice, he was gracious, tolerant, genial, charitable and gentlemanly. It has been my good fortune to have known Dr. Highman for over twenty years and it has rarely been my privilege to have met a mind as keen, a spirit as fine and a nature as generous.

Richard H. Hoffmann.

ABSTRACTS*

Primary Jugular Bulb Thrombosis. Jacob L. Maybaum and Joseph L. Goldman. Arch. Otol. 17: 70, January 1933.

The term primary jugular bulb thrombosis is used to designate the formation of an infected thrombus in the dome of the jugular bulb during the course of an acute middle ear infection without mastoid involvement. Certain anatomical facts, such as a thin bony partition separating the middle ear from the bulb, a high dome, and dehiscences, predispose to involvement of the bulb. The mastoid is usually sclerosed.

In children or young adults with a history of an acute infection of the middle ear, a fluctuating fever, progressive anemia, changes in the ocular fundi, and evidences of a general infection otherwise unaccounted for, primary jugular bulb thrombosis should be suspected. The additional presence of a positive blood culture (Streptococcus Hemolyticus) establishes the diagnosis. The majority of cases follow a characteristic course, suggesting a clinical entity. Twenty cases are reported.

Preventive Medicine Versus Expectant Treatment. Farel Jouard. Med. Jour. & Rec. 137: 188, March 1933.

The author discusses various phases of acute disease that are amenable to treatment and mentions a number of therapeutic measures applicable thereto.

Optically active hydantoins as hypnotics. Harry Sobotka, S. M. Peck and Jos. Kahn. J. Pharm. and Exp. Therap. 47: 209, February 1933.

Phenyl-ethyl-hydantoin, used under the name Nirvanol in the treatment of chorea minor as a sedative, was discovered to be a racemic mixture of dextro- and levo-phenol-ethyl-hydantoin. The dextro-drug is slightly less effective than the racemate, but its toxicity is only one-third of the latter as judged by the greatly reduced incidence of "nirvanol disease" upon oral administration.

This low incidence of "nirvanol disease" allows the question to be answered whether the curative effect of "nirvanol" depends upon the appearance of "nirvanol disease."

The present observations indicate that this is not the case. Dextro-phenyl-ethyl-hydantoin thus represents a distinct improvement in comparison to Nirvanol.

Postmenopausal Bleeding. Samuel H. Geist and Morris Matus. Am. J. Obst. & Gynec. 25: 388, March 1933.

A study of 182 cases of postmenopausal bleeding demonstrated that in 42 per cent the bleeding was benign in origin. The benign lesions were varied in character, including polyps, hypertrophic endometrium, fibroids, adenomyosis, benign ovarian tumors and inflammatory processes. Fifty-seven per cent were malignant in origin. In 15 cases the bleeding was associated with ovarian tumors, and 3 of these ovarian tumors were sarcomata. There is a possibility that the endocrine function of the ovarian tumor may play a rôle in the bleeding. The importance of a proper follow-up to rule out the possibility of an ovarian malignancy is emphasized where curettings are negative in cases of postmenopausal bleeding.

* Authors' abstracts of papers published elsewhere by members of The Mount Sinai Hospital Staff.

Dilatation and Hypertrophy of the Heart in Infants and in Young Children. M. A. Kugel and E. Gordon Stoloff. Am. J. Dis. Child. 45: 828, April 1933.

Seven cases of congenital idiopathic hypertrophy of the heart are described. All the cases in the literature have been reëxamined. In the authors' cases the pathological changes found were degeneration and atrophy of cardiac musculature, replacement fibrosis, scarring of the myocardium, endocardial fibrosis, vascular changes, and significant electrocardiographic changes. It has been demonstrated with the newer knowledge of the pathology and of the other factors causing dilatation and hypertrophy of the heart, that the group of cases of so-called "congenital idiopathic hypertrophy" is probably seldom, if ever, idiopathic.

Penetrating Stab Wounds and Bullet Wounds of the Chest. Joseph B. Stenbuck and John F. Conners. Ann. Surg. 97: 528, April 1933.

In most hospitals penetrating stab wounds and bullet wounds of the chest are treated without operation, apparently because the occasional experience with these cases has led to the conclusion that the patients seem to get well with expectant treatment. This, however, is only apparent because the mortality of collected cases is really high.

The personal observations of the authors in 68 cases in which exploratory thoracotomy was performed in a period of 11 months at the Harlem Hospital indicate that there are certain dangerous or potentially dangerous conditions which require immediate operation. These are: (1) Sucking wounds of the chest wall, (2) injury to the internal mammary artery or the heart, (3) the presence of the lung in the wound, (4) possible penetration of the diaphragm, (5) tense pneumothorax which does not respond to aspiration, and (6) rapidly spreading subcutaneous emphysema.

In a series of cases in which operation was performed according to these indications the mortality was reduced from 24.4 per cent to 12.5 per cent. The new operative procedure devised by the authors of extrapleuralization and exteriorization of the lung (whether lacerated or not) stabilizes the mediastinum, minimizes the chance of infection of lung and pleura, controls hemorrhage, and obviates the possibility of tense pneumothorax and spreading subcutaneous emphysema.

Clinical observations in these cases are also described.

The Viability of Fragments of Menstrual Endometrium. Samuel H. Geist. Am. J. Obst. & Gynec. 25: 751, May 1933.

By means of vital staining it was demonstrated that the desquamated fragments of endometrium that appear in menstrual blood retain their viability for at least an hour. It was also demonstrated that the fragments were able to pass through the lumen of the normal human fallopian tube. These observations add support to the Sampson theory of endometriosis.

Tyrosine and cystine content of serum proteins. Miriam Reiner and Harry Sobotka. J. Biol. Chem. 100: 779, May 1933.

Tyrosine and cystine content of the serum albumin and globulin of man and various animals were determined. The content of these amino acids in the various active and inactive fractions of equine anti-typhoid serum was also evaluated.

The cystine content of human serum proteins. L. R. Tuchman and Miriam Reiner. J. Biol. Chem. 100: 775, May 1933.

The cystine content of serum protein determined by the Folin-Marenzi-Looney method in 16 cases averaged 6.07 per cent in albumin and 3.64 per cent in globulin. No such characteristic deviations were observed as by Tuchman and Sobotka in the tyrosine percentage of edematous sera.

Fehling's solution and isomerism of tartaric acids. Harry Sobotka. J. Am. Chem. Soc. 55: 2164, May 1933.

Observations on the behavior of alkaline copper solutions as used in sugar analysis are reported.

A Photoelectric Exposure Meter for Photomicrography. Louis Gross and C. A. Johnson. J. Biol. Photographic Association 1: 172, June 1933.

A photoelectric exposure meter is described by which it is possible to accurately gauge the correct exposure time for photomicrographs. The instrument consists of a caesium cell with a suitable amplifying apparatus. A condensing lens is placed in the plane of the photographic plate to collect the light of the entire image to be photographed. A suitable field is selected with the object of transmitting the average intensity of light which can pass through the given section. This intensity is read on the meter. Correction is made for the filter and stains employed. The resulting figure makes it possible to employ time-temperature development. Illustrations of typical photomicrographs obtained by this method are submitted.

Thrombo-Angiitis Obliterans; Relief of Pain by Peripheral Nerve Section. Norman F. Lasky. Ann. Surg. 98: 55, July 1933.

The paper describes a method for the relief of pain due to ulcers or local gangrene in patients with thrombo-angiitis obliterans by the sectioning of the peripheral sensory nerves of the foot. A series of 18 cases were treated with complete relief of pain.

Chemical allergy and Nirvanol sickness. Béla Schick, Harry Sobotka and S. M. Peck. Am. J. Dis. of Child. 45: 216, June 1933.

Study of 53 cases, mostly of chorea minor and some of epilepsy. 25 were treated with nirvanol, 12 with levo-phenyl-ethyl-hydantoin, and 16 with dextro-phenyl-ethyl-hydantoin. The incidence of "nirvanol disease" with the last mentioned drug is greatly reduced. (Cf. preceding abstract.) Observations on reelicitation of nirvanol sickness, cross reactions with phenobarbital and on the localization of the eruption at the site of positive Pirquet and diphtheria toxin tests are reported.

Systolic Murmurs in Children. Murray H. Bass, Herman Mond, Charles R. Messeloff and Enid T. Oppenheimer. J. A. M. A. 17: 101, July 1933.

Sixty-four children with systolic murmurs, both organic and functional, were studied clinically and phonocardiographically. The records of all the murmurs contained vibrations of high frequency. Eighty-six per cent of all the functional cases presented high pitched vibrations only, while organic cases revealed low as well as high pitched vibrations. This suggests an additional means of differentiating between the two types of murmurs.

Further Roentgenographic Studies of the Chests of Children During Measles. Jerome L. Kohn and Henry Koiransky. Am. J. Dis. Child. 46: 40, July 1933.

In previous papers the authors reported the findings in successive roentgenograms of the chests of children during measles. It was shown that shadows suggesting pulmonic infiltration were present frequently before or during the height of the eruption. Abnormal intensity of the pulmonary markings, pleuropulmonary changes and progressive retrogressive hilar changes were also present. When the lateral position was used enlargement of the lymph nodes near the bifurcation of the trachea was found in nearly every case, irrespective of the presence or absence of pulmonary infiltration. When a child received immune serum soon after exposure and had a modified measles, pulmonary infiltration was not as frequent. The study of roentgenograms taken at necropsy clarifies the conception of the pathologic process.

Measles in Newborn Infants (Maternal Infection). Jerome L. Kohn. Journal Pediatrics 3: 176, July, 1933.

Eight cases of measles in early infancy are reported. There were five cases in young children infected by their mothers. In two of the cases the mother was incubating measles at the time of the birth of the child. In another case in which the mother was incubating measles at the time of the birth, the child was protected by convalescent serum. Two other children were born while the mothers were in the eruptive stage of the measles. One was given convalescent serum and the other was isolated. Both remained free of measles. Congenital measles and measles in early infancy are discussed.

Factors Causing Clinical Jaundice in Heart Disease. M. A. Kugel and S. S. Lichtman. Arch. Int. Med. 52: 16, July, 1933.

The lowest incidence of pulmonary infarction occurred in patients with subacute bacterial endocarditis in whom congestive heart failure rarely occurs, and in those with primary failure of the right side of the heart, in whom the left side is usually competent until the end. The highest incidence occurred in the group with rheumatic cardiovascular disease, mostly in those with disease of the mitral valves. This group also showed a longer duration of heart failure. Long standing pulmonary congestion, therefore, is a significant factor in the causation of pulmonary infarction, and the existence of a pulmonary infarct appears to be an almost indispensable factor in the causation of clinical jaundice occurring in 94 per cent of the cases. However, the data indicate that jaundice is not directly correlated with the degree of anoxemia induced by pulmonary infarction.

In addition to long-standing pulmonary congestion, a higher incidence of anatomic lesions of the liver and of systemic or pulmonary infection is found in patients with jaundice. A survey of the anatomic lesions of the liver and studies of the function of the liver make it apparent, however, that unless true cardiac cirrhosis of diffuse inflammatory vascular of the liver exists, the jaundice is not primarily of hepatic origin. Infection either systemic or pulmonary also plays an important contributory rôle, probably by influencing the rate of formation and resorption of the bilirubin from its source, the pulmonary infarct, and the rate of its excretion by the liver.

Pneumocephalus and Subarachnoid Hemorrhage Following Skull Fracture. Moses Keschner and Joseph Lander. J. A. M. A. 101: 24, July, 1933.

The authors have collected from the literature 95 cases of pneumocephalus, the great majority of which were traumatic in origin. More than half of the cases recovered. They describe another case of pneumocephalus with bloody spinal fluid following a fracture through the left frontal sinus. The patient made a complete recovery.

Osteomyelitis of the Skull. Abraham O. Wilensky. Arch. Surg. 27: 83, July 1933.

Skull osteomyelitis is conditioned by the anatomical localization of the disease, the intracranial complications which often dominate the clinical picture, and the contiguity of the process to the accessory cavities of the nose. Infection of the accessory sinuses of the nose form the commonest source of skull osteomyelitis, while those originating in the temporal bone are the rarest. Relatively rare is the hematogenous form of osteomyelitis of the skull.

The infection may progress either outward forming a subperiosteal abscess under the scalp, or inward forming an extradural or subdural abscess, with subsequent development of meningitis, or thrombosis of the longitudinal or cavernous sinuses. Pneumonia and bronchopneumonia are frequent sequeli. In many cases there occurs sequestrations; in others there is progressive necrosis.

Operative interference is indicated but conditioned by the accuracy of diagnosis.

The mortality of skull osteomyelitis is high. The fatal issue results usually from the general infection which may set in at any time in the course of the disease.

Postgraduate Courses to Be Given in the Fall of 1934 at the Mount Sinai Hospital in Affiliation with Columbia University*

(Continued)

DISEASES OF CHILDREN—V

Clinical Aspects of Cardiac Defects in Children Up to the Age of Sixteen—Dr. Roth.
Diseases of Children—Laboratory and Clinical Methods of Diagnosis—Dr. Kohn.
Conduct Disorders of Children—Dr. Wile.
Asthma in Children—Dr. Peshkin.
Diseases of Children—Diabetes Mellitus in Children—Dr. Fischer.
Clinical Pediatrics—Dr. Karelitz.

DERMATOLOGY—VI

Dermatology and Syphilis—Drs. Rosen, Chargin, Peck and staff.
Clinical Dermatology—Drs. Rosen, Levin, and Scheer

RADIOGRAPHY VII

X-ray Diagnosis of the Chest—Dr. Bendick.
Radiography of Gastro-intestinal Tract—Dr. Goldfarb
Roentgen Diagnosis of Bone Disease—Dr. Sussman.

OPHTHALMOLOGY VIII

Ophthalmoscopy—Dr. Schlivek.
Ophthalmology: (a) Refraction; (b) Muscles—Dr. Levine.
Ophthalmic Neurology—Dr. Lambert.
Clinical Ophthalmology—Dr. Minsky.
Ophthalmic Surgery—Dr. Goldstein.
Pathology of the Eye in General Disease—Dr. Wexler.

OTOLOGY—IX

Otologic Anatomy, Histology and Pathology—Dr. Druss

GYNECOLOGY—X

Gynecological Diagnosis and Treatment—Dr. Frank and staff.
Gynecological and Obstetrical Pathology—Drs. Frank, Geist and Goldberger.
Radiotherapy in Gynecology—Dr. Harris.

LABORATORY METHODS—XI

The Biochemistry of Liver, Gall-bladder and Pancreas—Dr. Sobotka.
Routine Chemical Methods as Used at the Mount Sinai Hospital—Miss Reiner.

* For further information concerning the courses please apply to Miss Edith M. Levy, Secretary for Medical Instruction.

PHYSICAL THERAPY—XII

General Physiotherapy—Dr. H. F. Wolf.
Physical Therapy with Especial Reference to Ear, Nose, and Throat Conditions—Dr. Jouard.

Routine House Staff Procedures

An instruction booklet given by the hospital to all members of the house staff beginning service, may be obtained by others on payment of One Dollar to defray the costs of preparation. The booklet contains practical directions for all the therapeutic procedures and clinical tests carried out in the hospital. Copies may be obtained from the librarian.

Intensive Course in Gastro-Intestinal Diseases

Instructors: Drs. G. Baehr, A. A. Berg, B. B. Crohn, S. J. Goldfarb, L. Gross, P. Klemperer, R. Lewisohn, B. S. Oppenheimer, H. Sobotka and A. Winkelstein.

An intensive course in Gastro-enterology and Disorders of the Liver will be given by the various instructors on the staff of The Mount Sinai Hospital in the month of November, 1934. This course is intended for practitioners who wish to advance their knowledge in the field of diseases of the stomach and intestines, of the liver and of the biliary ducts. It is intended to cover the recent advances in Gastro-enterology and to offer the contemporary viewpoint on these topics.

The course will include gross and microscopic pathology of the diseased processes; the bacteriology, chemistry and technic of the various methods used for diagnosis; a study of the radiography of the alimentary tract; fluoroscopic and plate reading. Medical diagnosis and treatment, indications for surgery, operative procedures and of the prognosis of diseases will be covered by didactic lectures, operative clinics and by clinical bedside teaching. The course will, in addition, correlate Gastro-enterology with internal medicine and discuss the relation of alimentary disorders and symptoms to the cardiovascular, genito-urinary, gynecological and neuro-psychiatric manifestations.

A detailed time schedule of the course will be forwarded upon application to the Secretary for Medical Instruction, The Mount Sinai Hospital.

VOLUME 1 NOVEMBER-DECEMBER, 1934 NUMBER 4

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

STREPTOTRICHOTIC SUPPURATION OF THE LUNG FOLLOWING ASPIRATION OF A FOREIGN BODY[1]

SYLVAN E. MOOLTEN, M.D.

[*Services of Dr. B. S. Oppenheimer and Dr. H. Neuhof*]

CASE REPORT

History (H. N. 352372). This patient's illness began with the aspiration of a foreign body into his bronchus nine weeks before his admission to the hospital. When he entered the hospital (May 20, 1933), he neglected to mention this fact and complained only of persistent pain for nine weeks in the right lower lateral regionof his chest wall and expectoration of moderate amounts of non-odorous muco-purulent sputum. He was feverish, somewhat emaciated and weak. There were physical and roentgenographic evidence of an extensive pneumonic infiltration of the right lower lobe (fig. 1). At times a pleural friction rub was detected. Leucocytosis was present (29,800) with a predominance of polynuclear neutrophiles (78 per cent). Because of the long duration of the process and its continued activity it was possible to exclude an ordinary lobar pneumonia. Tuberculosis was suspected, but repeated sputum tests were negative for tubercle bacilli. In view of the atypical nature of the condition, the possibility of endobronchial malignancy was considered despite the patient's youth (age 36 years) and bronchoscopic examination was advised. At bronchoscopy, a whitish fragment of bone was discovered partly occluding the right lower lobe bronchus which was filled with considerable pus; the bone was identified as part of a metatarsal bone. The patient now recalled that he had choked on a bone while eating calf's foot jelly just prior to the onset of his symptoms nine weeks previously.

Immediately after bronchoscopy the patient felt notably improved; he expectorated with greater ease, his temperature fell, and his appetite improved. The optimism of the observers was checked somewhat, however, by the persistence of the extensive infiltration. Gradually the temperature began to mount again; the patient's general condition grew

[1] Presented before the clinical pathological conference, November 1, 1933.

slowly worse, and evidences of increasing pleural effusion were detected. In the roentgenogram (fig. 2) two large sacculations of fluid were demonstrated, one axillary, the other mesial. Aspiration yielded thick greenish yellow pus of mucoid consistence; it had no odor. Culture of this yielded no growth. The patient was transferred to the surgical service for operative drainage. At the first operation part of the eighth rib was resected exposing a large empyema cavity filled with yellow pus. For one week the patient exhibited a septic temperature curve with daily oscillations from 100° to 104°. A swelling appeared in the chest wall overlying the ninth and tenth ribs with tenderness and fluctuation. Large segments of both

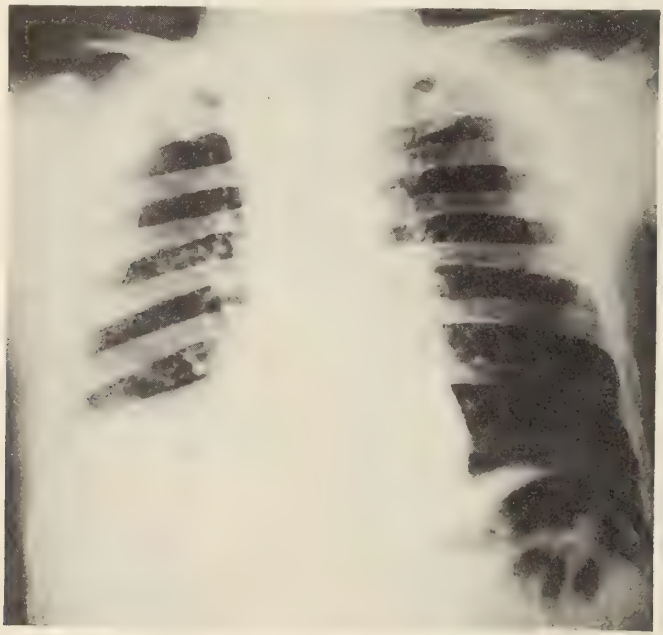


FIG. 1. Roentgenogram on admission showing pneumonic infiltration in right lower lobe.

ribs were accordingly resected at the second operation exposing another large empyema cavity formed between lung and diaphragm. Culture of pus yielded anerobic gram negative bacilli and diphtheroids.

Despite free drainage from the empyema wounds the septic fever continued. Roentgenograms showed a dense pneumonic shadow within the right lower lobe with evidences of progressive extension. Repeated aspirations failed to reveal additional pockets in the pleura. The patient began to have periodic tachycardia and dyspnea; bloody fluid was aspirated from the left pleural cavity and a roentgenogram showed a pneumonic infiltration in the left lower lobe. His general condition began to fail rapidly, and more outspoken manifestations of sepsis were observed.

Multiple superficial abscesses appeared in the subcutaneous tissue and skin of the face, neck, and right forearm. Transfusions were of no avail, and the patient died three months after his admission.

Necropsy findings. Skin: Superficial abscesses (2–3 cm.) were noted on the right cheek, forehead, neck and left knee. There was a large abscess (8 cm.) containing thick greenish pus on the right arm.

Thorax: The marrow of the entire sternum was replaced by dark bluish-green soft material with putrid odor; an area of perforation of the cortex of the sternum (2 cm.) was noted on the right side just below its manubrial angle through which the lesion extended into the soft tissues to involve the

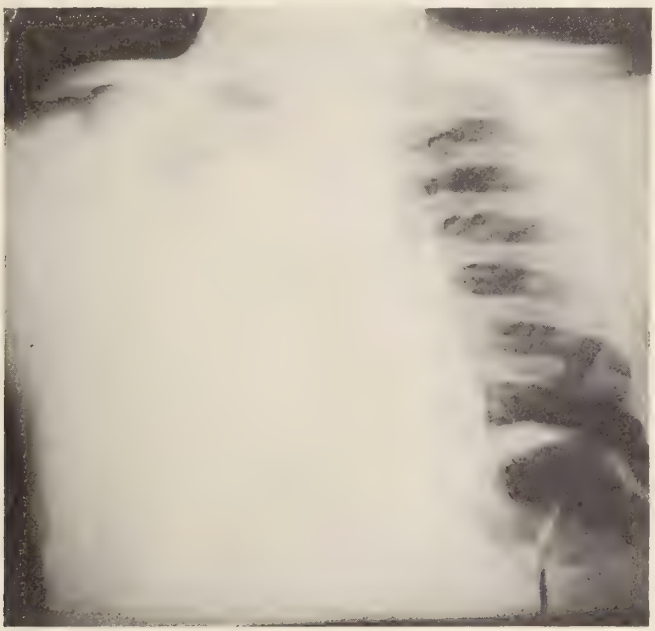


Fig. 2. Roentgenogram taken three weeks after removal of foreign body from bronchus showing extensive pleural effusion which is partly encapsulated.

right internal mammary vein; the latter was filled with thrombus which extended into the tributory intercostal veins. Microscopically the marrow spaces of the sternum were filled with dense leucocytic exudate, often appearing necrotic, containing numerous colonies of streptothrix.

The *thoracotomy* wound was situated in the postero-lateral portion of the right hemithorax exposing a large empyema cavity through surgical defects in the eighth, ninth, and tenth ribs. No retention of pus was detected; the lung surface was covered with a thick layer of exudate. Several bronchial fistulae opened into the base of the empyema cavity. The remainder of the pleural cavity on the right side was obliterated by ex-

tremely dense fibrous adhesions containing numerous small pockets of pus. The fibrous tissue was dense. It was nearly one centimetre in thickness in the lower portion of the lung (fig. 3), in places of a cartilaginous consistence, and it was adherent to the ribs, invading the intercostal tissues.

On cut section of *the right lung* extensive consolidation was noted involving the middle and lower lobes. The consolidation was dense, firm, gray-



FIG. 3. Cut surface of right lung showing grayish white consolidation of lower portion with multiple small areas of necrotic softening. Pleura obliterated by dense fibrous tissue forming thick shell about lung and containing areas of suppuration with necrosis.

ish white, with numerous areas of necrotic softening forming cavities of variable size containing thick greenish foul-smelling pus; many of these cavities could be shown to communicate with bronchi. The process was most marked nearest the pleura where many of the abscess cavities in the lung communicated with the pleural sacculations already noted. A marked increase in fibrous tissue was noted within the lung parenchyma extending inward from the thickened pleura and subdividing the infiltrated

tissue into areas of various sizes. Microscopically, the alveoli of the consolidated areas were largely filled with loose granulation tissue (organizing pneumonia), containing numerous eosinophiles, plasma cells, and lymphocytes. Large numbers of desquamated alveolar phagocytes filled the remaining alveolar lumen; in places these cells comprised the entire content of the alveoli (desquamative pneumonia); many were multinucleated, and their cytoplasm was foamy, often containing pigment. Here and there patches of dense infiltration with polynuclear leucocytes replaced necrotic parenchyma to form abscesses; the larger abscesses showed central necrosis of the exudate. Occasional colonies of streptothrix were seen in such areas in ray formation like that of Actinomyces, elsewhere in the form of long threads. Coarse, avascular scar tissue formed the dense pleural envelope noted grossly; within thicker portions occasional areas of suppuration necrosis were noted. The subpleural marginal alveoli were compressed, assuming a glandular aspect with cuboidal proliferation of their epithelium. The connective tissue sheaths of the bronchi and blood vessels within the parenchyma were edematous and infiltrated with leucocytes (eosinophiles, plasma cells) in the manner of a peribronchial interstitial pneumonia. Bronchi of medium size were often considerably dilated, their mucosa showing dense infiltration with leucocytes; often their wall was deeply ulcerated to form saccular bronchiectases (appearing as small abscess cavities grossly). In some places the bronchial epithelium had regenerated to line such saccules, the former pyogenic membrane becoming a wall of granulation tissue densely infiltrated with plasma cells and lymphocytes. The remainder of the right lung was markedly edematous and congested, with corresponding microscopic picture.

The left lung was considerably compressed by a pleural effusion of about two liters of cloudy reddish fluid. Much fibrinous exudate was noted on the pleural surface forming a shaggy coating which was easily separated. Numerous areas of consolidation were noted on cut section, chiefly in the lower lobe, becoming confluent toward the pleural surface. The appearance of the consolidation was similar to that of the right lung, including areas of suppuration-necrosis and bronchiectasis; fibrosis, however, was inconspicuous. The microscopic picture varied accordingly.

The *trachea and larger bronchi* were filled with edema froth and much purulent exudate; their mucosa was congested and inflamed, but showed no significant ulceration.

The *tracheo-bronchial lymph nodes* were moderately swollen, edematous, soft; on section, moderate anthracosis was noted, but no suppuration.

The *heart* was small, flabby, reddish brown with slight yellowish streaking of the myocardium; the epicardial fat was scanty. The endocardium was negative.

Liver: An abscess 1 cm. in width was noted projecting from the outer surface of the right lobe.

Pancreas, Adrenals: Negative.

Kidneys: A small superficial white area (5 mm.) was noted at the upper pole of the left kidney extending into its cortex 1 to 2 mm.

Spleen: The spleen was slightly enlarged, weighing 200 grams. It was very soft, and on cut section its pulp could be scraped away with ease; it had a dark red color with grayish tinge.

Blood vessels: Within the consolidated portion of the right lower lobe a large branch of a pulmonary vein was noted presenting a lesion in its intima in the form of an area of whitish thickening two centimeters in length; microscopically-purulent endophlebitis.

SUMMARY

This is a case of Streptothrix suppurative bronchopneumonia of both lungs complicated by empyema of the right pleural cavity, for which thoracotomy had been performed 5 weeks before death. Other complications included terminal sanguino-purulent pleural effusion of the left side, streptotrichotic thrombophlebitis of a branch of the pulmonary vein of the right lower lobe resulting in metastatic streptotrichotic abscesses of the skin, liver and kidney, and metastatic streptothrix osteomyelitis of the sternum with extension to the right mammary vein. At post mortem there were also noted parenchymatous degeneration of the heart, liver and kidneys and subacute septic splenic softening. The bony fragment previously removed by bronchoscopy had left no traces of its site of lodgment in the wall of the right bronchus.

COMMENT

Biologically the Streptothrix is closely related to the Actinomyces, both being classified as Actinomycetes. In contrast to Actinomyces it is primarily aerobic and grows typically in long threads with branchings, whereas the Actinomyces grows typically in compact colonies ("ray fungus"). These distinctions, however, are only relative as numerous intermediate forms and mutations are known. Thus in our own case, in which the lesions were morphologically quite typical of streptothrix infection, the organism was demonstrated both in thread form and in ray colony.

In general, streptothrix infection shows much less tendency to form scar tissue than Actinomyces, and accordingly is much less likely to be associated with massive fibrotic lesions of the pleura and chest wall with fistulous tracts leading from the lung to the skin. Instead, it produces more active suppuration and necrosis ("streptothrix necrotic bronchopneumonia") and may lead to ulceration of large portions of lung tissue. In this respect it is more nearly like tuberculosis, with which it is frequently confused clinically. Like the latter its pathway of dissemination through the lung is chiefly the bronchial tree. In the early stages of streptotrichosis of the lung lesions of the small bronchi and bronchioles are seen resembling in

many respects the corresponding "acino-nodose" lesions of tuberculosis. The later stages, in which ulceration is marked, may assume the form of saccular bronchiectases. With more extensive necrosis cavities of large size occur in a number of areas. It is not improbable that many cases of streptotrichosis pass unrecognized clinically under the diagnosis of "bronchiectasis," particularly in view of the banal character of the physical signs and symptoms. Many cases of "unresolved pneumonia" or "basal tuberculosis" may fall into this category. In streptotrichosis rupture of a necrotic focus with formation of empyema or pyopneumothorax as seen in our own case occurs more frequently than in actinomycosis. This is probably explained by the fact that pleural adhesions are much less dense in the former. A similar mode of extension may lead to streptotrichotic caries of the sternum or ribs, to pericarditis and even invasion of the heart muscle with subsequent hematogenous dissemination. Involvement of lymph nodes is rare as in actinomycosis, in marked contrast to tuberculosis. Both streptotrichosis and actinomycosis are similar to each other and differ from tuberculosis in their marked predilection for involvement of the pulmonary veins with resultant widespread hematogenous dissemination (thrombophlebitic sepsis). Such a phlebitis was found in our own case, accounting for the metastatic abscesses of the skin, liver and kidney.

Of particular interest in our case is the relation of the foreign body in the bronchus to the pathogenesis of this infection. It is generally conceded that streptotrichosis of the lung is an aerogenous infection, i.e., introduced through the air passages like actinomycosis and tuberculosis. Yet certain facts suggest the intervention of some additional predisposing element. Streptothrix and Actinomyces both occur rather frequently as normal saprophytic inhabitants of the tonsilar crypts and recesses of the gums or in decayed teeth; lesions caused by these organisms, however, either in these situations or in the lungs are comparatively rare. When such lesions occur, their localization may often be found to depend upon some physical injury such as a severe contusion or stab wound of the chest or upon some antecedent infection such as influenza. Such an explanation may underlie the occasional co-existence of pulmonary tuberculosis and streptotrichosis or actinomycosis. In a significant number of cases particulate vehicles of infection are demonstrable within the lung, such as cereal grains, splinters of wood, fragments of carious teeth, etc. This view is also borne out by the fact that streptotrichosis is said to occur most frequently in China following sandstorms. In our case it seems entirely justified to incriminate the fragment of bone lodged in the bronchus as the chief agency in the development of the streptothrix pneumonia.

REFERENCE

Arndt, H. J.: Die Streptotrichose der Lunge und des Brustfells, Henke u. Lubarsch, Handbuch der spez. path. Anat. u. Hist., Berlin, Julius Springer, 1931, Vol. III, p. 459.

"SECONDARY" ACQUIRED HEMOLYTIC ICTERUS[1]

REUBEN OTTENBERG

[*Service of Dr. B. S. Oppenheimer*]

Regarding the nature of acquired hemolytic icterus, first described by Hayem, there exist two divergent points of view. The one, represented by Eppinger (1), restricts the term to cases which are clinically and pathologically identical with Minkowski's familial hemolytic icterus. The patients show increased red cell fragility, reticulocytosis, etc. They are benefited by splenectomy. Although Eppinger does not say so, these cases should be regarded as occurring in individuals whose germ plasm has spontaneously undergone the peculiar mutation believed to be inherited in the familial disease.

The other point of view is that voiced by Naegeli (2). He regards acquired hemolytic icterus not as a disease but as a syndrome due to blood destruction by a great variety of known and unknown factors. The fragility of the red cells is not necessarily affected; the increase of reticulated red blood cells is only slight, and only rarely are the cases helped by splenectomy.

For the sake of clarity it would be advisable to accept Eppinger's point of view and to separate cases which do not show the increased fragility of the red blood cells described by Chauffard (3) as cases of secondary acquired hemolytic jaundice. Such cases constitute the majority of those recorded as "acquired," and such a case is here described.

CASE REPORT

History (H. N. 359804). The patient, a white female 70 years old, mother of nine living children, was admitted to the hospital on November 25, 1933. She had never been ill before.

Clinical data. 1. History of two definite attacks of biliary colic accompanied by jaundice with clay colored stools, respectively $1\frac{1}{2}$ years and 6 months before admission; persistence of the jaundice since the second attack.

2. Progressive and unrelenting anemia of the marked hyperchromic type with numerous normoblasts and a low leucocyte count.

3. Constant but not profound jaundice; increased blood bilirubin (4 mg.) but never with prompt direct van den Bergh in blood or bilirubin in the urine; constant urobilinuria (test positive at 1/40 or 1/80 dilution).

[1] Presented before the clinical pathological conference of Mount Sinai Hospital, January 31, 1934.

4. Large liver and spleen, bromosulphalein and galactose tests normal; blood cholesterol low (120 mg. cholesterol, esters 23 mg.).

5. Normal hydrochloric acid in the stomach; normal duodenal contents and stool.

6. Low reticulocyte count (0.5 per cent) on admission but extraordinary reticulocyte response (up to 30 per cent) on liver therapy. In spite of this reticulocytosis, which persisted even after the liver injections were stopped, there was never any corresponding increase of hemoglobin or red cells.

7. Slightly increased red cell fragility (beginning laking at 0.52 per cent NaCl).

8. Wassermann reaction positive (4 plus); several of the patient's children were examined and showed negative Wassermann Tests.

9. Complete failure of response to all forms of therapy; iron and liver extract by mouth, and liver extract intramuscularly; repeated blood transfusions; bismuth injections and potassium iodide by mouth.

10. Progression of the anemia terminating after two months in the hospital in cardiac failure and bronchopneumonia.

Clinical diagnosis: During life it was believed that she had a biliary cirrhosis of the liver, the result of cholelithiasis, and that the persistent anemia was due to an acquired hemolytic icterus, probably due to the cirrhosis and, perhaps, also to syphilis of the liver.

Necropsy findings. Gross anatomy: Spleen large (splenomegaly), weight 475 grams, fleshy in consistency; on section glazed, moist, and deep reddish brown in color showing several infarcts.

Liver weight 1800 gms. Hepatic and common bile ducts moderately widened. Ball valve stone in common bile duct.

Chronic cholecystitis with cholelithiasis.

Hemosiderosis of liver, spleen and abdominal nodes.

Terminal lobular pneumonia of lower lobes both lungs.

Mucopurulent bronchitis with moderate cylindrical bronchiectasis. Atrophic emphysema. Healed infarcts of left lower lobe with complete obliteration of a branch of pulmonary artery: dilatation of right ventricle (atrophy of left ventricle).

Severe coronary sclerosis and myocardial fibrosis. Arteriosclerosis—ulceration of the aorta with adherent thrombi.

Lipoid histiocytosis of mesenteric and peripancreatic lymph nodes.

Microscopic anatomy: Spleen: Pulp moderately congested and quite cellular. Sinuses recognized with some difficulty because of the cellularity. Innumerable large histiocytes containing brownish granular pigment positive for iron by Turnbull's method are found throughout all cords and sinuses. Large mononuclear histiocytes are the most numerous cells of the sinuses. Occasional erythrophagocytosis.

Liver: Lobular architecture intact. Fine granules staining slightly brownish with hematoxylin eosin and giving the iron reaction are scattered

in the cytoplasm of the liver cord cells. The pigment is distributed throughout the cells and involves almost all.

Bone Marrow: practically normal.

A note by Dr. Klemperer reads: "The histology of the spleen lacks the active hyperemia so constantly found in the constitutional familiar hemolytic anemias. The factor of excessive hemolysis is well shown by the striking hemosiderosis of spleen and liver.

DISCUSSION

It was felt from the first that the disease had originated with the two attacks of biliary colic; and this was confirmed by the finding of a ball valve stone about as large as a green pea in the papilla of Vater. But this stone was evidentally not responsible for the jaundice which the patient showed when admitted to the hospital, because that was clearly not of an obstructive but of a hemolytic type.

During the patient's life it seemed most natural to regard this hemolytic anemia as a sequel to a splenomegalic biliary cirrhosis caused by back pressure. When the positive Wassermann reaction was found, it was felt that syphilis might be a contributory or independent cause of the hemolytic process.

However, at post mortem neither biliary cirrhosis nor organic evidence of syphilis could be seen, although the abundant hemosiderosis and the histological picture of the spleen confirmed the diagnosis of a hemolytic process.

The remarkable fact (confirmed by independent observers) that the reticulocytosis, so characteristic of the hereditary form of hemolytic icterus was absent when the patient was first seen but appeared and persisted after liver extract administration, suggests that there was a deficiency of some "anti-anemic factor" necessary for the full maturation of the red cells. That this was not really a deficiency of the anti-anemic factor of Minot is evident. It may have been some fraction of it; or some functional disturbance initiated by the gallstone attacks may have interfered with the normal utilization of such a maturation factor.

The case was evidently one of an acquired hemolytic jaundice or hemolytic anemia. It was an entirely different disease from familial hemolytic jaundice. The blood destruction does not appear to have been due to the same defect of the red cells as in the constitutional variety: e.g. the cells were large rather than small, their fragility was only slightly impaired; and reticulocytosis developed only after liver extract was given. The bone marrow was not hyperplastic. Whatever its cause the process was hemotoxic and did not arise in the bone marrow. The enlargement of the spleen was due to the enormous proliferation of histiocytes as a reaction to the constant destruction of red blood cells. The specific anatomic finding of hyperemia of the spleen, the only anatomic characteristic of heredi-

tary hemolytic icterus, was absent. For this reason, splenectomy, which was seriously considered during the patient's life but not carried out because of her age and feebleness, would probably have been of no avail.

REFERENCES

(1) Eppinger, H.: Die Hepato-Lienalen Erkrankungen. Berlin, Julius Springer, 1920, p. 223.
(2) Naegeli, O.: Blutkrankheiten. Ed. 5. Berlin, Julius Springer, 1931, p. 334.
(3) Chauffard, A.: Pathogenie de l'ictere congenital de l'adulte. Semaine med. (Paris), 28: 25, 1907.

HEMANGIO-ENDOTHELIOMA OF RIGHT PARIETO-OCCIPITAL REGION

Post-operative Result[1]

IRA COHEN, M.D.

[*From the Neurological and Neurosurgical Services*]

Fluctuations in the symptoms and signs during the evolution of a brain tumor are not uncommon. The abrupt changes noted in the following case, however, are somewhat unusual. The variation in the picture, almost from day to day, is more apt to be associated with a chronic subdural hematoma than a brain neoplasm.

CASE REPORT

History (H. N. 345327). A young man, aged 20 years, with a history of periodic attacks of headache for three years was admitted on November 4, 1932, to the Neurological service. His early history was essentially negative except for the fact that up to the age of 4 years he had had fits of temper. Since that time, except for some emotional instability shown by crying easily and laughing inordinately at times, he had been well until 1929. He then was seized with a very severe frontal headache which lasted several days. Since that episode the headache recurred about every two months. On only one occasion was it associated with vomiting. About the end of 1930 he noted that his eyes became easily tired when reading. Glasses were prescribed but gave no relief. About ten days before admission to the Mount Sinai Hospital he began to suffer from one of his periodic headaches. This time, however, he noted that in addition to the usual frontal pain there was also discomfort in the occipital region. He visited the out patient department of another hospital where one of the internes, while questioning the patient noted a gross visual field defect and had the patient hospitalized. There it was revealed that the patient was suffering intensely with headache, that he held his neck rigidly and protected his head from any sudden movement, and that he was mentally depressed. There was a gross defect in the left fields of vision and both fundi showed early papilledema. There was a slight left facial weakness and a slight weakness of the left arm.

Examination. On admission to the Mount Sinai Hospital about a week later he presented the following: The headache was gone, but he was still

[1] Presented before the clinical conference of the Mount Sinai Hospital, January 27, 1933.



FIG. 1. Roentgenogram of the cyst after direct injection of air

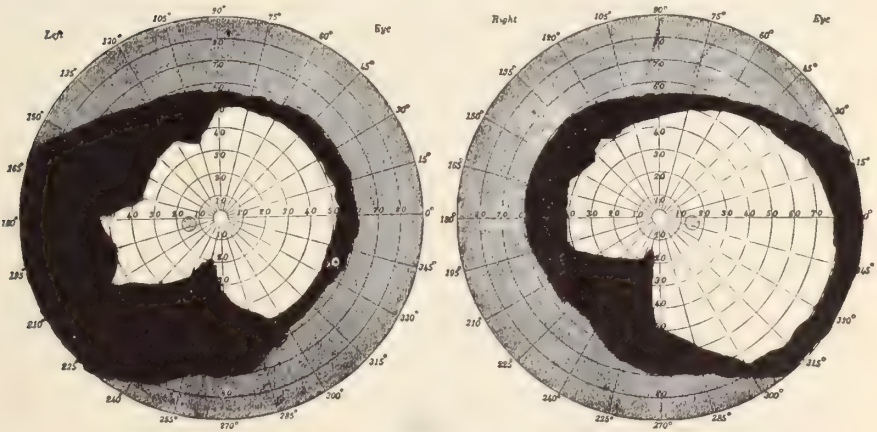


FIG. 2. Defect in the left lower quadrant of the visual fields noted just prior to the craniotomy.

depressed. The papilledema remained unchanged. Perimetric studies disclosed normal fields for both form and color. He had a left central facial weakness, a slight weakness of the left arm, and some ataxia in that extremity. The deep reflexes in the left lower extremity were more active than in the right, and at times a left Babinski was obtained. Laboratory tests were negative except for an elevation in the spinal fluid pressure. There was no headache and no visual defect.

Course. An encephalography was carried out. It failed to show any air on the right side, but there was no ventricular shift. Under further observation the papilledema receded and the visual fields remained normal. It was decided to introduce air directly into the ventricles (ventriculography). On December 1, a brain needle introduced through a trephine opening in the right occipital region encountered xanthochromic fluid (50 cc. were removed and 45 cc. of air were injected). The fluid removed did not coagulate spontaneously. Even after studying the X-ray plates (fig. 1) there was no reason to feel that the aspirated fluid did not come from a shut off posterior horn of the right lateral ventricle rather than from a cyst. Therefore, 16 days later, air was injected through a trephine opening in the left occipital region. X-ray studies now showed displacement of the posterior horn and body of the right lateral ventricle.

About this time the papilledema returned and for the first time the visual field studies showed a left homonymous lower quadrantic defect (fig. 2).

On December 22, a right parieto-occipital flap was turned down under local anesthesia and the suspected cyst located. The cortex was incised in the region of the angular gyrus and the cyst opened. Soft tumor tissue and a piece of solid tumor tissue somewhat smaller than an English walnut, was excised. The tumor was at such a depth that the ependyma of the lateral ventricle was exposed laterally and anteriorly in the course of the removal of the tumor. The pathological report of the tumor was hemangio-endothelioma.

The patient was discharged on January 17, 1933, one month after the operation, at which time there was some improvement in the visual fields. He still had a central facial weakness on the left.

COMMENT

The interesting feature in this case lies in the rapid changes of the clinical picture. There were periodic headaches with free intervals of several months, and in the course of a few week's observation, recession and increase of the papilledema. The fields of vision were at first grossly defective, then normal, and then again displayed a quadrantic defect. The reflexes were variable from time to time. The vascular and cystic nature of the tumor probably played a predominant part in the fluctuation of the symptoms. Although eventually the localization of the neoplasm would probably have been made without the aid of ventriculography, the procedure visualized the neoplasm and facilitated the surgical approach.

INFRAPULMONARY PYOPNEUMOTHORAX[1]

ARTHUR S. W. TOUROFF, M.D.

[*Surgical Service of Dr. Harold Neuhof*]

A case of pyopneumothorax, encapsulated between the diaphragm and the base of the lower lobe, which resulted from necrosis of an area of probable pulmonary infarction, in a patient with cardiac decompensation. The X-ray films, although simulating those seen in cases of sub-phrenic abscess, were quite characteristic. Because of the patient's precarious condition, operation was performed in two stages with recovery.

CASE REPORT

History (H. N. 359609). The patient a white female, aged 39 years, was admitted to the hospital on November 2, 1931. The essential points in her history included chronic cardiovalvular disease of 12 years duration, characterized by recurrent episodes of auricular fibrillation and cardiac decompensation. The valvular disease in all probability was of rheumatic origin. Three days before admission the patient suffered a sudden attack of palpitation associated with dyspnea and cyanosis. Shortly thereafter she experienced cough with bloody expectoration associated with pain in the right chest and fever of 102° to 103°.

Examination. At the time of admission the essential physical findings were as follows: Temperature 102°; respiration 48; apical pulse rate 100; peripheral pulse rate 84. The patient was cyanotic, dyspneic, orthopneic, and stuporous. The heart was greatly enlarged to the left and somewhat to the right. The impulse at the apex was forceful and heaving. A diastolic shock was present in the pulmonic area, and P_2 was louder than A_2. There was a blowing systolic murmur over the entire precordium which was best heard at the apex. At the right base posteriorly there was dull tympany extending upward to the region of the spine of the scapula. In this area, voice and breath sounds and vocal fremitus were very faint. The liver edge could be felt three fingers' breadth below the costal margin. There was slight pretibial edema. The blood pressure was 146 systolic and 90 diastolic. White blood cells, 25,400; polymorphonuclear neutrophiles, 87 per cent; lymphocytes, 7 per cent; monocytes, 3 per cent; eosinophiles, 3 per cent. The urine contained 4+ albumin, many red cells, white cells, and granular casts; the guiac test was 3+. Pneumococcus Type IV was grown from the sputum. An electrocardiogram revealed

[1] Presented before the clinical conference of Mount Sinai Hospital, January 27, 1933.

evidence of auricular fibrillation, right ventricular preponderance, and a curve suggesting myocardial failure.

Course. The diagnosis made was chronic cardiovalvular disease, mitral stenosis and insufficiency, auricular fibrillation, and myocardial failure. The physical signs in the lungs were difficult of interpretation, but it was



FIG. 1. Infrapulmonary pyoneumothorax. Base of lower lobe (indicated by upper arrow) elevated to a marked degree by a subjacent collection of pus and air. Compressed base of lower lobe at first glance appears to be the diaphragm. (Diaphragm actually lies at a lower level and is obscurred by the fluid (indicated by the lower arrow).) Note faint lung markings and pulmonary fissure (indicated by center arrow) situated above fluid level, proving that diaphragm lies lower down. Note cardiac displacement. Cardiac enlargement is due to chronic valvular disease.

thought that the patient was suffering either from pneumonia or a pulmonary infarct. The history of frankly bloody expectoration, sudden pain in the chest, and long standing auricular fibrillation tended to support the latter diagnosis. The patient was at times stuporous and occasionally psychotic, and examination therefore was difficult.

Under digitalis therapy the pulse became slow and regular within a few days. The temperature, however, remained elevated, the toxemia continued, and the psychotic manifestations became more marked. Two days after admission roentgen examination was performed (see fig. 1). In the region of the right base a collection of fluid surmounted by air was seen. Above the collection of air a transverse band was noted which at first glance resembled the diaphragm, giving the lesion the appearance of a subphrenic abscess containing gas. On closer inspection, however, faint pulmonary markings could be seen superimposed on the collection of air which lay below the transverse band previously mentioned. This definitely ruled out the band as representing the diaphragm and established it as being the base of the lower lobe. The latter had become elevated and compressed by a pyopneumothorax which lay between the under surface of the lobe and the diaphragm. The diaphragm itself lay at a lower level and was obscured by the collection of fluid.

Aspiration of the chest in the region of the lesion revealed the presence of reddish-brown pus which on smear contained polymorphonuclear leukocytes but no organisms. Because of the poor condition of the patient and the marked psychotic manifestations, operative interference was considered urgent. Accordingly, under local anesthesia (in the patient's room) aspiration through the ninth interspace in the posterior axillary line was performed. A small amount of thin bloody pus and a large amount of air were withdrawn. Through a small incision, a tube was introduced in air tight fashion at the site of aspiration, and under-water drainage was established.

Following operation the temperature which had ranged around 103° gradually fell, psychosis gradually lessened, and the general condition improved markedly. There was moderate drainage of pus through the tube together with large amounts of air. Twenty-two days after the first operation, the patient's condition had improved to such an extent that it was deemed safe to proceed with a more extensive procedure. Accordingly, under local anesthesia, open thoracotomy with rib resection was performed. About four inches of the eighth rib was resected subperiosteally and a large empyema cavity entered. The latter lay between the diaphragm and the under surface of the lower lobe. In the costrophrenic sinus anteriorly, the peripheral portion of the base of the lung was adherent, and thus separated the collection of fluid and air from the anterior chest wall. This adherent tongue of lung explained the appearance of pulmonary markings superimposed on the collection of air on X-ray examination. On the undersurface of the lobe in the region of the costovertebral gutter, a defect in the lung which measured about three-quarters of an inch in all diameters and which was about one inch deep, was found. This was thought to represent an area of infarction which had sloughed away. After all of the pus and detritus had been evacuated, the empyema cavity and the defect in the lung were both packed with gauze.

Following operation the patient made rapid improvement. Several days later a blowing bronchial fistula was noted at the site of the defect in the lung. Convalescence continued with gradual fall in temperature and disappearance of toxemia and psychosis. The patient was discharged on the fifteenth day after operation with a clean cavity which was being rapidly obliterated. The wounds finally healed without incident.

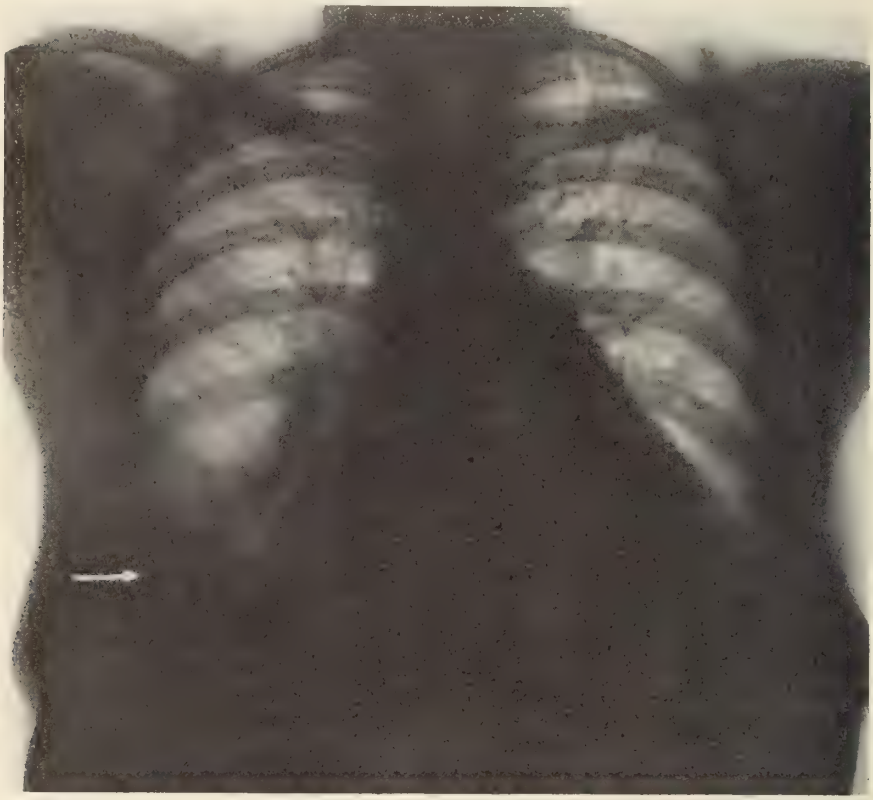


FIG. 2. Same patient as in figure 1, six months after operation. Note expansion of lung and return of enlarged heart to normal position as indicated by location of its right border. Residual thickening of pleura (indicated by arrow) still present at base.

Roentgen examination at the present time reveals that the lower lobe has re-expanded completely. There is still a small amount of residual pleural thickening in the region of the operative site (see fig. 2). Since the first admission, the patient has been readmitted to the hospital five times because of recurrent episodes of cardiac decompensation but has been free of all symptoms referable to the condition for which operation was performed.

COMMENT

The case is of interest because infrapulmonary pyopneumothorax is in itself a rare lesion. On roentgen examination it is often extremely difficult to differentiate the lesion from a subphrenic gas-containing abscess. The case illustrates a method of performing graded surgical procedures on very ill patients.

REFERENCE

Touroff, Arthur, S. W.: Infrapulmonary empyema. Surg. Gynec. and Obst., 57: 156, 1933.

CARDIAC ARRHYTHMIAS IN GRAVES' DISEASE[1]

DR. SOLON S. BERNSTEIN

[*Service of Dr. B. S. Oppenheimer*]

Cardiac arrhythmia, either transient or established, is the most frequent manifestation of the thyrotoxic heart in Graves' disease, appearing at some time in the course of the disease in at least twenty per cent of the cases; this proportion rises considerably in the presence of congestive failure. Although practically every form of irregularity has been observed in this disease, auricular fibrillation either in its paroxysmal or permanent form is the most common. The delicate balance between the cardioacceleratory and cardioinhibitory mechanisms is revealed in the not uncommon occurrence of paroxysms of tachycardia, sinus in origin, or less frequently initiated in some ectopic focus of increased irritability in the auricles, ventricles, or A-V node. Increased neuromuscular irritability is also manifested by premature contractions of variable origin, singly or in groups. Auricular flutter and varieties of A-V block are less commonly observed.

The four cases herein described, all observed concurrently in the Hospital, demonstrate the incidence and frequency of these arrhythmias.

Case I (H. N. 361399). A housewife, 32 years old, entered the hospital on January 1, 1934, with a three year history of increasing nervousness, palpitation, and enlargement of the neck. She was carefully observed throughout the entire period preceding her admission and her pulse was uniformly regular. The basal metabolic rate on admission was plus 61 per cent. The response to Lugolization was slow, but when the rate was reduced to plus 30 per cent, four weeks after admission, a subtotal thyroidectomy was performed. On the third post-operative day she experienced severe substernal distress and was found to have auricular fibrillation. This arrhythmia persisted for four hours. On the fifth day she again complained of substernal oppression with marked palpitation, but her ventricular rate was 180 and regular. An electrocardiogram confirmed the impression of a paroxysmal tachycardia of sinus origin. On the twelfth day, while walking about the ward, she experienced faintness and vertigo, and her apical rate, which had hitherto varied from 90 to 100, was found to be 52. The electrocardiogram revealed a simple sinus tachycardia. Within three hours the rate again became 96, and without further similar episodes she was discharged four weeks after operation. When seen at

[1] Presented before the clinical conference of Mount Sinai Hospital, March 23, 1934.

the thyroid follow-up clinic one month after discharge, she stated that she had not experienced any recurrence of the arrhythmia.

Case II (H. N. 363077). A salesman, aged 54, was admitted to the hospital on January 26, 1934. Three months before admission he developed marked Graves' disease and shortly after the onset of his nervousness and loss of weight he experienced recurrent episodes of substernal oppression with what he describes as a totally irregular cardiac rhythm. Six weeks before admission this rhythm became permanent. Glycosuria, which had been present for more than twenty years, was easily controlled with a restricted diet. On admission he presented a picture of a profoundly toxic Graves' Disease with auricular fibrillation. The apical rate was 146 with a pulse deficit of 24. The basal metabolic rate was plus 64 per cent which was reduced within three weeks to plus 32 per cent. A right thyroidectomy was then performed. The apical rate promptly became 96 with a pulse deficit of 10, but the fibrillation has persisted to the present time. He is to return for the second stage thyroidectomy within a month.

Case III (H. N. 361227). A bookbinder, 42 years old was admitted on January 6, 1934, with a three months' history of increasing weakness and loss of weight. He presented the clinical picture of a florid Graves' disease with marked exophthalmos, a regular pulse of 124, and a basal metabolic rate of plus 68 per cent. With Lugolization, the basal metabolic rate fell to plus 34 per cent, the pulse to 96, and a right hemithyroidectomy was performed. On the second post operative day he developed auricular fibrillation which persisted for 14 hours. On the fourth day he experienced a similar episode of 10 hours duration. The subsequent cardiac rhythm remained regular. He is to return for the second stage operation within a few weeks.

Case IV (H. N. 356706). A housewife, aged 34, was admitted September 6, 1933 with a one year history of increasing appetite, nervousness, palpitation, marked loss of weight, and diarrhea. She appeared extremely toxic, the pulse ranging from 110 to 124, and the basal metabolic rate was plus 54 per cent. Several attempts at Lugolization failed to reduce the metabolic reading or to control her nervousness, and she manifested a true "iodine escape." Shortly after admission, while receiving Lugol's solution, she experienced the first of a series of attacks of paroxysmal tachycardia of sinus origin, the heart rate ranging from 180 to 200. During these episodes which lasted from one to several hours, she became incoherent and at times stuporous and cyanotic. Although prepared for operation on two occasions, the mere removal to the operating room precipitated repeated paroxysms of tachycardia, and the operative procedure had to be postponed. The onset of menstrual periods regularly induced attacks.

Except for the presence of occasional isolated premature beats of ventricular origin, the rhythm was regular in intervals between the paroxysms. Several applications of radiotherapy to the region of the thyroid gland failed to influence her condition. After four months of observation, it was finally decided to risk operation in spite of the probability that a paroxysm of tachycardia would occur. A right partial thyroidectomy was performed on February 1 at a time when the rate was 200. It fell to 160 during operation and 120 on the following day. This rate persisted until February 28, when with the onset of menstruation, a six hour paroxysm of tachycardia with a heart rate of 188 occurred. She experienced three similar attacks with less severe general symptoms until the successful completion of the second stage operation on March 14. Except for one brief similar episode ten days after operation a relatively slow regular sinus rhythm was present until the time of her discharge from the Hospital on April 23, 1934.

COMMENT

The almost simultaneous occurrence of four instances of cardiac arrhythmia in Graves' disease emphasizes the frequency of this condition. Therapy directed against the underlying thyrotoxicosis is the most effective method of controlling the irregular rhythm. Post-operative arrhythmias are frequent, but fortunately are as a rule transient in character and apt to disappear with rest and sedatives.

BENIGN PELVIC TUMORS ASSOCIATED WITH ASCITES AND PLEURAL EFFUSION[1]

U. J. SALMON, M.D.[2]

[*Service of Dr. Robert T. Frank*]

The following three cases are of singular interest because of the fact that in each one a benign tumor presented a clinical picture closely resembling that of malignancy with metastases. The salient clinical feature of the cases consisted in the presence of a pelvic tumor associated with ascites and pleural effusion. In one case the tumor was a simple fibroma of the ovary; in the other two, fibromyomata of the uterus were found.

CASE I

History (H. N. 337216). The patient, a married Jewess 52 years of age, whose past history was essentially irrelevant entered the Hospital April 7, 1932. For three months before admission she was conscious of a mass in the lower abdomen which had increased steadily in size. Her chief complaint upon admission was irregular cramps in the lower abdomen of several days' duration, not accompanied by any gastro-intestinal symptoms.

Physical examination. Temperature 100°; pulse 74; respiration 22. The patient was a fairly well nourished female who did not appear acutely ill. Signs of fluid were found in the right chest. In the abdomen a tense, tender, somewhat irregular mass could be felt arising from the pelvis and reaching to the umbilicus. Her hemoglobin was 78 per cent; white blood count, 9,000; polymorphonuclear neutrophiles, 80 per cent; lymphocytes, 17 per cent; monocytes, 3 per cent. The sedimentation time was 13 minutes. The urine examination and the Wassermann reaction were negative. The right chest was tapped and 1500 cc. of amber colored fluid aspirated. Laboratory examination of the fluid revealed: Specific gravity 1018; red blood cells, 1800 per cubic millimeter; white blood cells, 350 per cubic millimeter; lymphocytes, 70 per cent; polymorphonuclear neutrophiles, 30 per cent. No organisms were found on smear or culture. No tumor cells were found on centrifugalization. The fluid rapidly reaccumulated and the chest was tapped again on two occasions, 1500 cc. and 2000 cc. of straw colored fluid being removed. Roentgenogram of the chest following the aspiration failed to reveal any abnormality in the lungs or chest wall

[1] Presented before the clinical conference of Mount Sinai Hospital, January 26, 1934.

[2] Joseph Brettauer Fellow in Gynecology.

to account for the effusion. X-ray examination after the second aspiration disclosed a small amount of fluid also in the left chest.

Since no definite conclusions could be arrived at concerning the etiology of the effusion, it was felt that the nature of the pelvic tumor should be investigated. A laporatomy was performed and about 500 cc. of deep amber colored fluid found in the peritoneal cavity. A solid tumor of the right ovary about the size of a large canteloupe was removed. The abdomen was thoroughly explored and no other abnormality was found. Convalesence was uneventful except that on the eight post-operative day signs of fluid were detected in the right chest and 500 cc. of sero-sanguinuous fluid were aspirated. The pathologist reported the tumor as: "edematous fibroma with necrosis."

It is now 24 months since the patient was discharged from the hospital. Since then she has had no symptoms and has gained 40 pounds in weight. There are no signs of fluid in the chest or abdomen. X-ray examination of the chest now reveals nothing abnormal.

CASE II

History (H. N. 346807). The patient, a married Russian Jewess, 47 years of age, who had had one stillbirth 16 years before admission and no pregnancies since then was admitted to the hospital December 15, 1932. Her past history was essentially irrelevant. Her chief complaint was menorrhagia during the preceding two years, with periods lasting 10 to 14 days.

Physical examination. Temperature 99.8°, pulse 86, respiration 20. The patient was a well nourished middle aged female. The findings of significance were: a moderate diffuse enlargement of the thyroid, signs of fluid in the right chest, and a smooth, firm mass arising from the pelvis and reaching to the umbilicus. On pelvic examination the uterus was found enlarged by multiple fibroids to the size of five and one-half months gravidity. The adnexae could not be felt. Her hemoglobin was 56 per cent; and sedimentation time one hour and five minutes. Wassermann reaction was negative.

The chest was aspirated and 600 cc. of sanguinous fluid removed. Smears and cultures were negative. No tumor cells were found in the centrifugalized specimen. The fluid rapidly reaccumulated and the patient was tapped again and 700 cc. of sanguinous fluid removed. X-ray of the chest after the tapping revealed some fluid still in the right chest but no signs of metastasis. Since no cause could be found to account for the pleural effusion, it was felt that the pelvic tumor might be implicated. Accordingly, a laporatomy was performed. About 300 cc. of sanguinuous fluid was found in the peritoneal cavity. The pelvic tumor consisted of a large fibroid uterus, which, except for its intraligamentous development on the right side exhibited nothing unusual. The abdomen was explored

and no signs of disease were found elsewhere. A typical supravaginal hysterectomy was performed. Convalescence was uneventful. The pathologist reported "multiple fibromyomata; hyperplastic endometrium; follicular cysts of ovaries."

It is now 17 months since discharge from the hospital. She has been examined on several occasions since then and no signs of fluid in the chest or abdomen were found. Roentgenogram of the chest at present reveals no signs of fluid or parenchymatous disease of the lungs.

CASE III

History (H. N. 352017). The patient, a married colored female 38 years of age, was admitted to the hospital May 12, 1933. She had had one child now 18 years old. Her menstrual history had been normal until seven months before admission, since which time there had been complete amenorrhea. The patient's chief complaint was progressive increase in abdominal girth which first became noticeable nine months ago. During the six months preceding admission, the patient had had 18 abdominal paracenteses, at times as often as once a week, and as much as eight quarts of sero-sanguinous fluid was removed on several occasions.

Physical examination revealed a fairly well nourished colored female. Temperature 99.4°; pulse 80; respiration 20. The findings of significance were marked ascites and a firm non-tender mass the size of a cherry in the right inguinal region. Pelvic examination showed a retroverted uterus, not enlarged. Above it could be felt a firm, smooth, globular mass reaching to the umbilicus. The mass was definitely ballottable. A fluid wave was imparted to the vaginal finger through the cul-de-sac.

Her white blood count was 8000; polymorphonuclears, 60 per cent; lymphocytes, 30 per cent; monocytes, 10 per cent; hemoglobin, 88 per cent; sedimentation time 27 minutes; and blood Wassermann negative. Paracentesis was performed and 6,300 cc. of amber colored fluid were removed. No tumor cells were found in the fluid.

A laporatomy was performed. A gallon and a half of amber colored fluid was aspirated from the peritoneal cavity. The tumor was found to be a solid myoma which was attached by an attenuated pedicle to the fundus of a small uterus. The omentum was adherent to the surface of the myoma and large tortuous vessels from the omentum fed the parasitic myoma. Myomectomy was performed. Exploration of the abdomen failed to reveal any other causes for the ascites. The pathology report was "fibromyoma."

Her convalescence was uneventful. It is now 13 months since discharge from the hospital. Since that time the patient has gained 12 pounds in weight, the abdomen has remained flat, and there are no signs of fluid in the abdomen or chest.

COMMENT

Three cases of benign pelvic tumor are reported, each of which presented a clinical picture usually associated with ovarian malignancy, viz., ascites and pleural effusion. In the first case the tumor was a fibroma of the ovary; in the second, simple fibroids; in the third, a pedunculated, partially parasitic fibroid. In the first two, the pleural effusion was marked, requiring repeated tapping; the ascites, however, was slight in amount. In the third case there was no pleural effusion but there was marked ascites, the patient having been tapped 18 times in 6 months.

The clinical examinations, roentgenograms of the chest, as well as bacteriological and cytological examination of the fluid in each case failed to shed any light on the etiology of the pleural or peritoneal effusions. The failure of the fluid to reaccumulate in either the chest or abdomen after removal of the tumor suggests that the tumor in each case was responsible for the effusions. The mechanism whereby these effusions are produced remains unexplained.

These three cases teach an important clinical lesson. The association of ascites with a pelvic tumor particularly if a pleural effusion is present at the same time, completes so perfect a picture of ovarian malignancy with metastases that the mistake is likely to be made of condemning such a case as inoperable. To avoid such an error, an exploratory laporatomy should be performed on all cases of pelvic tumors, even if associated with ascites and pleural effusion, providing that microscopic evidence of metastases in lymph glands or in the aspirated fluid cannot be demonstrated.

ACUTE INFECTIOUS MENINGO-MYELO-RADICULITIS

DR. D. E. SCHNEIDER

[*Service of Dr. I. Strauss*]

A case of the now widely recognized clinical picture of meningo-myelo-radiculitis merits description because of its several atypical features. At its onset it simulated subacute combined degeneration of the spinal cord as seen in pernicious anemia; it presented changes in the optic discs, which raised some interesting questions as to the etiology of and the distinctions between true papilledema and toxi-infectious optic neuroretinopathy; and finally it displayed a dissociation between vibratory and deep muscle sense.

CASE REPORT

History (H. N. 354427). A 46 year old white male entered the hospital on July 11, 1933. His past history contained the following possibly relevant facts. He had given 4 blood transfusions of 250 cc. each from 1928 to 1930 without apparent ill effect. Four months previous to admission during a volley ball game he had fallen on his back, arms outstretched, landing forcibly on a hard gymnasium floor. After this he noticed a weakness in his right leg which gave way causing him to stumble frequently. He observed too that his hands felt numb for a few hours thereafter. However, except for a slight, occasional, transient weakness in the right lower extremity, he was well for the next $3\frac{1}{2}$ months until a falling ladder struck his right foot and bruised the toes. On that night there appeared slight stiffness of the neck and simultaneously, numbness in the toes of the right foot which spread rapidly to involve both lower extremities. Two days later he experienced tingling and numbness of the upper extremities especially affecting the hands, and the handgrip weakened. Difficulty in performing the finer, skilled movements of the fingers, e.g., writing, buttoning, etc., set in. A neurologist observed a widebased tottering gait, poor coördination on heel to knee test, marked Romberg sign, at times a lack of full appreciation of deep sensation on the ulnar aspects of both hands and forearms, and a 70 per cent loss of vibratory sense in the lower extremities over all bony prominences up to the crests of the ilia. The deep tendon reflexes in all four extremities could not be elicited. The abdominal and cremasteric reflexes were obtained but were exhaustible. Flexion and extension of the feet upon the legs were weak.

Laboratory data obtained at a hospital in Syracuse on June 25, 1933, about

2 weeks before admission to the Mount Sinai Hospital revealed the following: Hemoglobin, 85 per cent; the red blood cells showed marked variation in size and slight variation in shape, suggestive of primary anemia.

Lumbar puncture: Water clear cerebrospinal fluid was obtained under normal pressure; there was a good response to jugular compression. Globulin was very markedly increased (no record of cells).

Wassermann tests of blood and spinal fluid were negative.

Gastric contents showed no free hydrochloric acid in the fasting specimens but after a test meal there was 25 degrees of free and 60 degrees of total acidity.

On July 1, 1933, 11 days before admission, after a week of daily injections of liver extract, the patient was again examined. He showed greater instability of gait and station and other evidence that the process was progressing. A blood examination at this time showed: Hemoglobin, 85 per cent; red blood corpuscles, 3,490,000; white cells 9000; polymorphonuclear leucocytes, 64 per cent; lymphocytes 20 per cent; large monocytes, 16 per cent. Red blood cells showed variations in size only, suggestive of pernicious anemia. No nucleated forms were seen.

The blood pressure was 146 systolic and 96 diastolic.

The case was considered as one of postero-lateral sclerosis of the cord with major involvement of the posterior columns. Multiple sclerosis, progressive muscular atrophy, and traumatic cervical pachymeningitis, were considered as possibilities. Two weeks before admission to the hospital on two occasions he had felt sharp pains in the lower dorsal spine. There were no urinary symptoms. He had only one erection since the onset of the present illness.

Examination. The patient was well developed, well nourished and afebrile. The neurologic status revealed the following positive findings:

1. Gait—tottering and on a wide base; the patient is unable to walk and is confined to bed.
2. Slight incoördination on heel to knee, and finger to nose tests.
3. Diminished motor power in hands which showed slight but definite atrophy of the dorsal interossei and questionably pseudoathetoid movements. Poor tone in muscles of calves and arms; flabbiness of the musculature.
4. Deep reflexes in upper and lower extremities diminished, ankle jerks absent.
5. Bilateral Babinski sign.
6. Absent vibratory sense below the anterior superior iliac spines, bilaterally.

Course. The opinion at first was that the signs of posterior and lateral column involvement pointed to a system disease of the spinal cord. The underlying cause could not be clearly defined. For a time, the possibility of non-tropical sprue was entertained and on this basis "Vegex," a commer-

cial preparation of concentrated B and G vitamins was administered, but without any beneficial effects. On the contrary, the disease process seemed to progress. The patient became completely bedridden. A blood examination, however, revealed no findings to suggest pernicious anemia; Hemoglobin, 100 per cent; red blood cells, 5,300,000, the white count and its differential entirely within normal limits. The cerebrospinal fluid showed an increase in globulin and a total protein of 120 mg. per 100 cc. The Queckenstedt manoeuvres produced a prompt rise in intraspinal pressure, but there was a slightly delayed fall. Another blood examination by the hematologist, a week after admission showed the following; Hemoglobin, 112 per cent; red blood cells, 5,780,000; color index 1; platelets, 240,000; white blood cells, 11,900; polymorphonuclears, non segmented, 12 per cent, segmented, 45 per cent; eosinophiles, 7 per cent; lymphocytes, 31 per cent; mononuclears, 5 per cent.

In view of the week of liver therapy, a color index of 1, the report of 3,490,000 red cells, and the hemoglobin of 85 per cent before entering the hospital, the possibility of a remission in the blood status of pernicious anemia had to be considered. However, this was deemed unlikely in view of two gastric analyses, both of which though indicating no free hydrochloric acid in the fasting specimen, produced abundant free acid after a test meal.

The evolution of the clinical picture soon produced signs indicative of another etiology. Three weeks after admission it was noticed that the patient's left pupil had become much larger than the right and that the muscles of the thighs and calves and later of the upper extremities were very tender to pressure. So very tender was the course of the nerve trunks, that relatively moderate compression over the course of the sciatic made the patient scream. There was a bilateral Lasegue. A few days later on August 7, 1933, another examination showed, in addition to the muscle tenderness, vague zones of disturbances in touch and pain from the toes up to the fifth dorsal dermatome not conforming to any definite anatomic distribution. The patient was unable to sit up. It was then recognized that the condition was an obscure form of polyneuritis with minimal changes in the cord. It was decided to subject the patient to foreign proteid therapy, and typhoid vaccine was administered intravenously. Six weeks after admission, after a series of 8 injections of the vaccine each followed by a good rise in temperature, the patient began to show improvement. There was at first a return of power in the right lower extremity, then in the left. The muscle tenderness became slightly lessened. Erections began to recur. In searching for a focus of infection several teeth were found infected. About ten days after the extraction of these teeth he began to complain of flashes of blue light in front of his eyes. An ophthalmologist reported advanced edema and elevation of the optic discs and the surrounding retinae with many flame-shaped hemorrhages

radially arranged, situated on the margins of the discs in the immediate peripapillary regions. The blood pressure at this time was 150 systolic and 90 diastolic. Opinions as to the etiology and nature of the neuroretinal changes differed. True papilledema was considered because visual acuity remained unimpaired but the probability of the condition being secondary to vascular disease or possibly toxic could not be excluded. The neurological service was inclined toward the infectious optic neuropathy and accepted it as confirmatory evidence of the presence of a diffuse inflammatory neural disease. An autogenous vaccine was then made from the organism isolated from the apical abscesses and during a course of 11 intradermal injections the patient made a steady improvement in motor power as well as in absorption of the retinal hemorrhages. During the next eight weeks he continued to improve and when discharged December 12, 1933, 5 months after admission to the hospital, he was able to walk although his gait was somewhat spastic. The reflexes were still unchanged, and there was a tendency to show a Babinski sign on the left. Vibration was still absent up to the iliac crests, and the left disc was blurred.

A month later, on January 11, 1934, the patient reported at the follow-up clinic. He walked quite well, there was a right lower facial weakness, the pupils reacted well, the left disc was blurred but pinkish in color, and the muscle power was good. All tendon reflexes were absent, but the position sense was good. Vibration was absent up to the iliac crests. The abdominal reflexes were elicited but were exhaustible.

SUMMARY

The unusual features in this case of diffuse inflammatory disease of the nervous system are: the toxic optic neuropathy and the extreme tenderness associated with vague radicular disturbances and extensive posterior column involvement. They can be explained only on the basis of the wide distribution of the toxic infective agent. The loss of vibration with the relative preservation of position sense is unusual and may be explained by a peripheral involvement of proprioceptive fibres. Muscle tenderness, however, has been observed in extensive posterior column disease. It is significant that even in the early stages of the disease in spite of the suggestive blood findings the diagnosis of combined sclerosis accompanying pernicious anemia was not accepted as final, because of the absence of an important cardinal finding, *the achlorhydria.*

A CASE OF CORONARY THROMBOSIS WITH PERICARDIAL EFFUSION

A. M. MASTER, M.D., AND HARRY L. JAFFE, M.D.

[*From the Cardiovascular Laboratory and the Medical Service of Dr. George Baehr*]

Acute pericarditis without effusion, the result of coronary thrombosis, is so common that a pericardial rub is considered confirmatory evidence of coronary occlusion. However, a clinical diagnosis of pericardial effusion following coronary occlusion has as yet not been reported, though post-mortem examination disclosed such a lesion on rare occasions.

Levine (1) found one patient with pericardial effusion in 145 cases of coronary thrombosis that he reported. This complication was not diagnosed during life but necropsy disclosed 1000 cc. of fluid in the pericardial sac. Camp and White (2) in a report of 126 cases of pericardial effusion reported two patients who died with signs of chronic passive congestion and an associated coronary occlusion. Smith and Willius (3) described post-mortem examinations on sixty cases of pericarditis with effusion and in two noted acute cardiac infarction, the result of coronary thrombosis. As far as we can ascertain the following is the first case reported in which a clinical diagnosis was made of coronary occlusion with pericardial effusion. X-ray film confirmed this diagnosis. The patient recovered.

CASE REPORT

History (H. N. 363478). A woman of 57 years, an American housewife, was admitted to the hospital on March 8, 1934. Her past history was uneventful. A few days before admission she suddenly developed sharp precordial pain while hurrying up a flight of stairs. Her heart felt "tied in a knot." After a few minutes the pain was replaced by soreness. During the next few days substernal pain was present; the patient was nauseated and vomited. She felt weak and chilly.

Examination. The patient was an obese woman, who appeared acutely ill. Her temperature was 102°F.; the pulse rate 120 beats per minute; the blood pressure 128 systolic and 72 diastolic. She was dyspneic. There were dulness, distant bronchial breathing and voice, and moist râles over the left lower lobe. A gallop rhythm was heard in the region of the cardiac apex and the heart sounds were faint. The leucocytic count was 8,900 cells, of which 76 per cent were polymorphonuclear neutrophils. The basal metabolic rate was normal. An X-ray film of the chest on the day of admission (fig. 1a) showed a marked enlargement of the heart shadow to the left. The following day a pericardial friction rub to the left of the

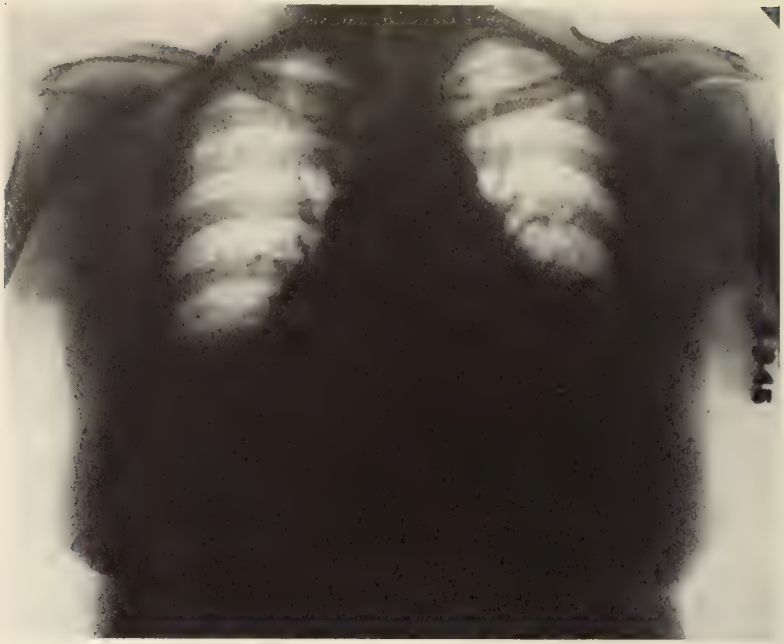


FIG. 1a. March 8, 1934. Pericardial effusion

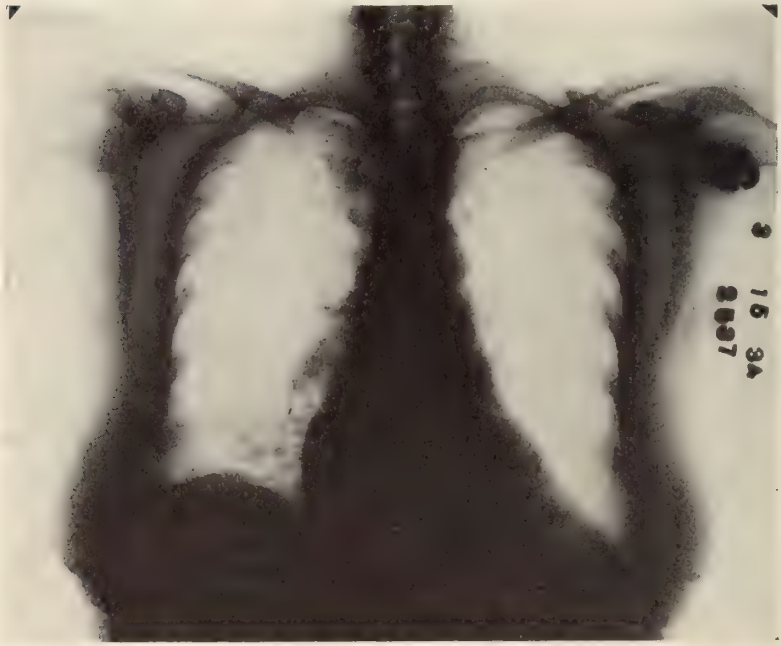


FIG. 1b. March 15, 1934. Absorption of pericardial effusion

sternum was heard. Two days later the rub could no longer be heard and a week later the chest film (fig. 1b) revealed the heart to be normal in contour and size. An electrocardiogram disclosed a regular sinus rhythm rate about 85 to 90 beats per minute, definitely low voltage of the QRS group and left ventricular preponderance. By March 17, 1934 (fig. 2a) the T-wave in Lead II was flat (isoelectric) and on March 23, 1934 (fig. 2b) the T-waves were inverted in Leads I and II. The temperature fell rapidly,

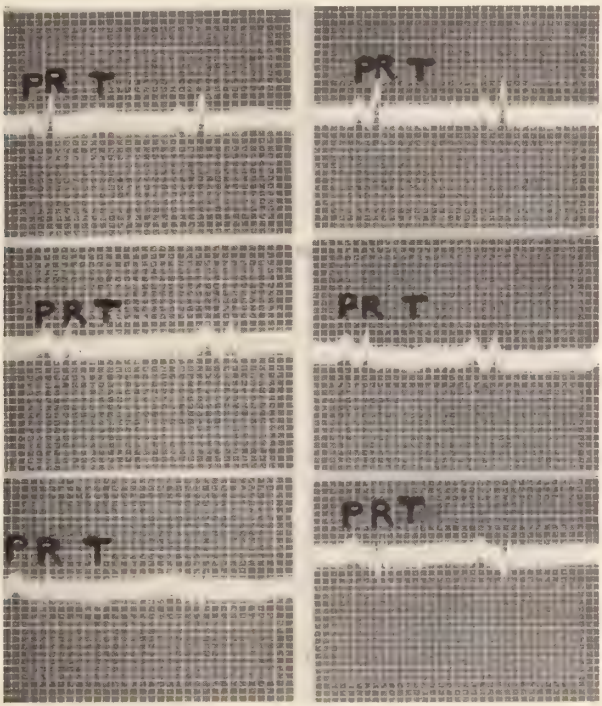


FIG. 2a FIG. 2b

FIG. 2a. Electrocardiogram (March 17, 1934). Low voltage QRS, left ventricular preponderance, small T-wave in lead II and inverted T-wave in lead III.

FIG. 2b. Electrocardiogram (March 23, 1934). T-Wave now inverted in leads I and II, no longer inverted in lead III.

The abnormalities in both electrocardiograms are due to myocardial damage caused by coronary closure or pericardial effusion but probably the result of both.

the blood pressure dropped to 98 systolic and 64 diastolic. The general condition improved and convalesence was progressive although there was occasional pain in the chest. The heart sounds grew louder. The patient was fluoroscoped before discharge from the hospital (April 3, 1934) and nothing abnormal was observed in the heart or lungs. On a follow-up examination three and a half months later fluoroscopic and teleoroentgeno-

graphic examinations were normal although the patient still complained of precordial pressure on slight exertion.

COMMENT

The dulness and other physical signs in the left lower lobe, presented by the patient on admission led to the diagnosis of pneumonia. But the marked enlargement of the heart, the pericardial rub and the X-ray findings made the diagnosis of pericardial effusion certain. It might be considered that the pericardial effusion was a complication of the pneumonia, but in pneumonia a pericardial effusion is usually associated with an empyema, the effusion is purulent, the patient is extremely sick, and the outcome is usually fatal. Moreover, in our case on subsequent examinations the patient was still suffering from an anginal syndrome due to coronary artery disease, and although the T-waves of the electrocardiogram had become positive the voltage of the QRS group remained low. Other possible causes of pericardial effusion such as rheumatic fever or tuberculosis were absent. It is not possible to exclude a hemopericardium (4) due to a rupture of a coronary vessel but the course of such an event is very acute and short and the outcome is almost always fatal.

CONCLUSIONS

1. Pericarditis with effusion may be a complication of coronary thrombosis.

2. Pericarditis with effusion following a coronary artery occlusion should be suspected when the area of cardiac dulness is considerably increased. An X-ray picture will confirm this suspicion.

3. Pericarditis with effusion due to coronary infarct may be recognized during life and the patient may recover.

REFERENCES

(1) Levine, S. A.: Coronary Thrombosis: Its Various Clinical Features. Medicine, 8: 245, 1929.

(2) Camp, P. D., and White, P. D.: Pericardial Effusion: A Clinical Study. Am. J. M. Sc., 184: 782, 1932.

(3) Smith, H. L., and Willius, F. A.: Pericarditis. III. Pericarditis with Effusion. Arch. Int. Med., 50: 192, 1932.

(4) Olcott, C. T.: Rupture of a Coronary Artery, Hemopericardium. New England J. Med., 204: 760, 1931.

ICHTHYOSIS VULGARIS

Report of a Case Illustrating Sex-linked Inheritance

DAVID BERES, M.D., and CHARLES R. MESSELOFF, M.D.

[*Service of Dr. Bela Schick*]

We are reporting the following study of a family with ichthyosis vulgaris because it afforded the unusual opportunity of examining directly the members of four generations, and because it presents a clear-cut example of sex-linked recessive inheritance, the Mendelian mechanism which operates also in the heredity of hemophilia.

REPORT OF CASE

(H. N. 72666.) G. G., a Porto-Rican boy 9 years old was admitted to the Out Patient Department of the hospital with a skin condition supposedly present since birth. The diagnosis was ichthyosis vulgaris of a moderately severe degree involving the entire body, but most marked over the extensor surfaces of the extremities. The rest of the physical examination revealed no abnormalities. Laboratory studies, including blood count, urine examination, and blood Wassermann were all negative. Treatment consisted of thyroid in small doses and the application of oils to the skin. The mother reported little or no improvement.

A study of the family yielded the accompanying genealogical tree. The two individuals in the first generation are deceased. Information concerning them was obtained from their daughter.

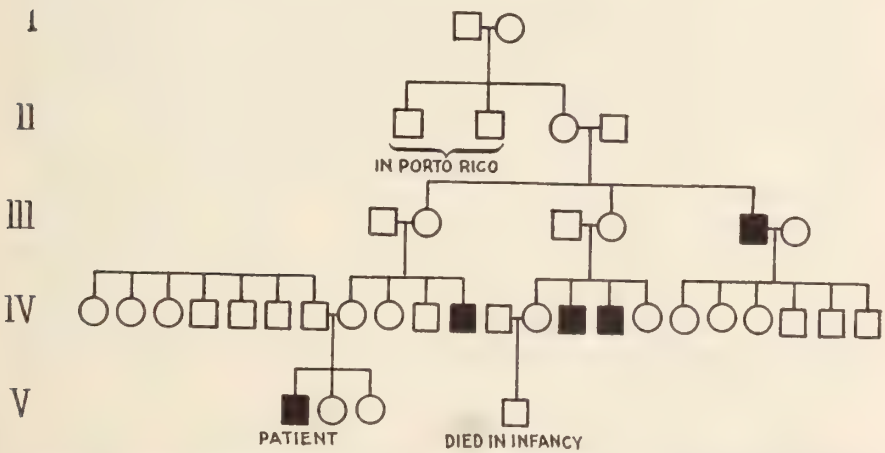


Fig. 1. The numerals on the left indicate generations. Circles represent females and squares males. The squares filled in black represent males with ichthyosis vulgaris.

COMMENT

The most striking feature of this family tree is that only males are affected and that transmission is exclusively through the unaffected females. Careful examination of all the individuals indicated on the chart (except those in the first generation and the father in the second generation) revealed no evidence of the disease except in the five males indicated. Each of these presented the disease in moderate to severe degree with universal involvement of the skin. In every case the onset dated from birth. A branch of the family is still in Porto Rico and therefore could not be examined. However, the American part of the family is very conscious of the presence of this disease and insists that no other members are affected. Recent correspondence confirms this impression.

In the third generation there are three children. The two daughters are normal, and the third, the son, has ichthyosis vulgaris. In the fourth generation the latter's six children are all normal, while his two sisters have three diseased sons (out of four males) and four normal daughters.

There was no consanguinity in any of the marriages.

DISCUSSION

It has long been recognized that ichthyosis vulgaris is a hereditary disease. Bramwell (1) in 1903 presented a family in which sex-linked inheritance is apparent, a work which is all the more noteworthy because at that time Mendelism was just being rediscovered after a lapse of several decades. The recognition of sex-linked inheritance actually came a number of years later.

Genetic studies in the literature indicate that sex-linked recessive inheritance is not the only Mendelian mechanism operating in ichthyosis vulgaris. A large group of careful studies (2, 3, 4) are best explained by assuming a single dominant gene. In these cases heredity is direct, without skipping generations, and affects both males and females. We have under observation such a family in which mother and son are affected.

The conclusion follows that at least two different hereditary mechanisms can independently result in ichthyosis vulgaris. In the language of genetics, different genes in different chromosomes can independently cause the appearance of the same somatic characteristic, ichthyosis vulgaris. This phenomenon is of frequent occurrence in experimental animals. T. H. Morgan, for example, has described at least fifty sets of genes that affect eye color, scattered in the four sets of chromosomes of the fruit fly. Thus, depending on which gene one happens to be talking of, the heredity of eye color in the fruit fly will be described as sex-linked recessive, dominant, ordinary recessive or blending.

It is not possible at present to make any clinical differentiation between

ichthyosis vulgaris inherited as a sex-linked recessive, and that inherited as a dominant. Cockayne (5), in his masterly book, points out that so far all cases described as dominant have occurred in Europeans, while the sex-linked recessive type occurs more commonly in the Latin races. The family mentioned above, in which the disease is present in mother and child, is Danish.

Hereditary factors are also important etiologically in other dyskeratoses, especially in ichthyosis congenita and keratoma hereditarium palmare et plantare. However, these present problems entirely independent from the heredity of ichthyosis vulgaris.

REFERENCES

(1) Bramwell, B.: Ichthyosis: Marked Hereditary History. Clinical Studies, 1: 74–80, 1902–3.

(2) Leven, L.: Stammbaum einer Ichthyosis Familie. Arch. f. Dermat. u. Syph., 139: 117, 1921.

(3) Wehefritz, E.: Zur Vererbung der Ichthyosis. Ztschr. f. Konstitutionlehre, 10: 394, 1924.

(4) Siemens, H. N.: Studien über Vererbung von Hautkrankheiten. Arch. f. Dermat. u. Syph., 158: 111, 1929.

(5) Cockayne, E. A.: Inherited Abnormalities of the Skin and Its Appendages. London, Oxford University Press, 1933.

ACCESSIONS TO THE NEUROPATHOLOGIC MUSEUM

I. Primary Ependymitis[1]

JOSEPH H. GLOBUS, M.D.

In this case acquired, natural pathology supplants the experimental method in demonstrating (1) the importance of the subarachnoid space as the main channel for the distribution and reabsorption of cerebrospinal fluid, (2) an anatomic basis for the development of internal hydrocephalus and (3) the reason for the occasional restriction of an inflammatory process to the lining of the ventricular cavities of the brain.

The circulation of cerebrospinal fluid. There is little doubt now that the cerebrospinal fluid is formed in the ventricular cavities of the brain. Equally certain is the fact that it is manufactured by the chorioid plexuses; whether it is secreted, excreted, or filtered by the plexuses projecting into the lateral, third and fourth ventricles is still an open question. Since the production of this fluid is an uninterrupted process, a mechanism must exist to instantly remove the fluid from the ventricles, or else it would accumulate in quantities far in excess of the ventricular space. Thus, openings in the ependymal lining and adjacent pia form early in the embryonal life of the organism and, simultaneously, a space is created by the splitting of the meninges into the two delicate membranes enveloping the brain and spinal cord: the pia and the arachnoid. In this way the piarachnoid or subarachnoid space is formed. The cerebrospinal fluid on entering this extensive space is distributed over the surface of the brain to be reabsorbed there by the numerous pial vessels. In this manner a balance is established between the production and the absorption of the fluid. A patent subarachnoid space is, thus, essential to the mechanism of maintaining the equilibrium between intraventricular formation and extra ventricular disposal of cerebrospinal fluid. The subarachnoid space must remain open and available to receive the constant output of cerebrospinal fluid. It must be accessible, or else anything that will block the free flow of cerebrospinal fluid into the space will cause an excessive accumulation of the fluid in the ventricles and ventricular distension leading to the formation of internal hydrocephalus (fig. 1).

Primary ependymitis. While ependymitis, particularly purulent ependymitis, is quite common when it is secondary to an inflammatory process in a neighboring part of the brain, it is rather rare as an independent or primary disease of the lining membrane of the ventricles. When it does

[1] Presented before the clinical pathological conference.

occur, it is assumed that the chorioid plexus serves as the channel of infection. Under given circumstances the latter permits the passage of the infecting organism into the ventricular fluid and then, if the flow of the cerebrospinal fluid is retarded, the ependymal lining is rendered susceptible

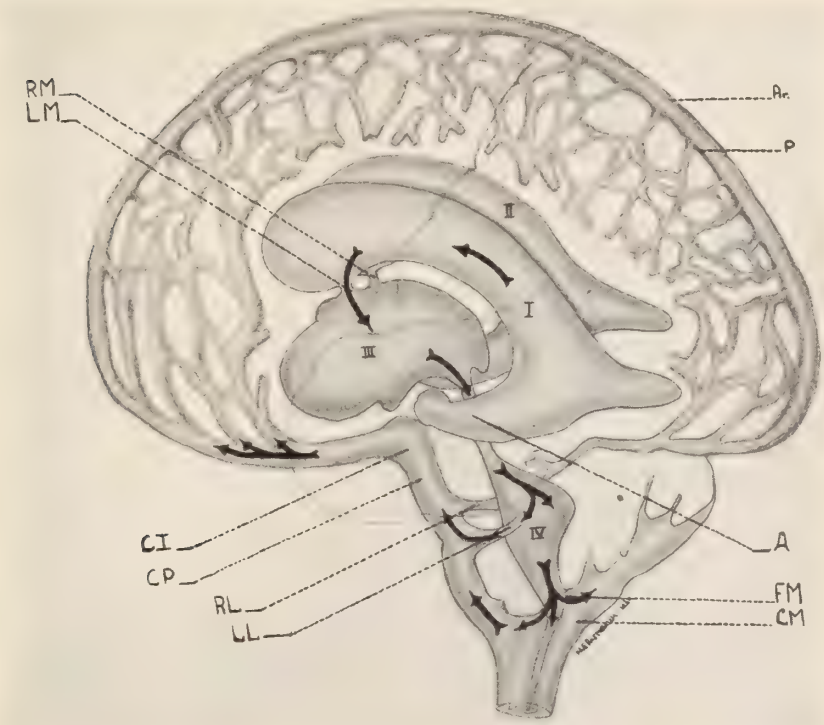


FIG. 1. Drawing illustrating the pathways of cerebro-spinal circulation. The fluid which is formed in the lateral ventricles (I and II) enters the third ventricle (III) by way of the foramena of Monro (R.M. and L.M.). There it is augmented by fluid formed in the third ventricle and empties, as the arrow indicates, through the aqueductus of Sylvius (A) into the fourth ventricle (IV). There the formation of the cerebrospinal fluid is completed, and the fluid leaves the ventricular system by way of the foramen of Magendie (F.M.) to enter the cisterna magna (C.M.) The fluid moves now forward, passes through the cisterna pontis (C.P.) and, on reaching the cisterna interpeduncularis (C.I.) and the many channels arising at this point, distributes itself in subarachnoid space over the entire cerebral surface.

The foramena of Luschka (R.L. and L.L.) are small openings in the fourth ventricle permiting further escape of fluid into subarachnoid space. The subarachnoid space is between the arachnoid (Ar.) and the Pia (P.).

to a direct mass attack of the infecting organism. The restriction of the inflammatory reaction to the ependyma becomes more certain when the flow of cerebrospinal fluid is completely arrested by a preëxisting obliteration of the subarachnoid space as in the case to be reported.

CASE REPORT

History. (H. N. 318796). The patient's head was large since birth. Up to the age of 8 years, however, he displayed no abnormality of mental or physical development; he was considered to be a very bright child. At the age of 8 years following "brain fever," he became unable to walk and was confined to bed for two years. The diagnosis of "water on the brain" was made. During the first year of illness gradual loss of eye sight led to complete blindness. During the past eighteen years he was disabled by paralysis of his left leg, and mentally retarded. Several days before admission to the hospital he developed a slight "cold." On the morning of admission, September 28, 1930, it was noticed that he was attempting to get out of bed, but fell back upon the pillow and appeared to be semiconscious. His temperature rose and, when he was brought to the hospital, it was found to be 103°.

Examination. The patient, a white male, aged 28 years, was acutely ill, and in coma. The head was large. The pupils were fixed to light, in mid dilatation and unequal, the right pupil being larger than the left. There was bilateral optic atrophy. The throat was red, and there was considerable amount of mucopus on the posterior pharyngeal wall. The right ear drum was red, the small process being the only landmark visible. There was moderate rigidity of the neck, bilateral Kernig sign, increased deep reflexes, bilateral Hoffman sign and suggestive right Babinski sign.

Course. A lumbar puncture, revealed cloudy cerebro-spinal fluid under considerably increased pressure, containing 4,000 cells per cubic millimeter practically all polymorphonuclear neutrophils. A smear revealed a Gram-positive organism. There developed constant irregular movements of the eye balls in all directions with moderate dissociation between the right and left, and occasional rhythmic jerking of extremities and head. The patient was given 20 cc. of anti-meningococcus serum, intraspinally and 40 cc. of the same serum intravenously. Culture of the cerebrospinal fluid revealed a pneumococcus type IV. On September 30, 1930, no fluid could be obtained by lumbar puncture. On October 1, the diagnosis of ependymo-encephalitis was suggested, and it was predicted that there was an obstruction in the ventricular system and that a cisternal puncture would fail to give him relief. As suspected, cisternal puncture followed by lumbar puncture revealed a complete block somewhere above the cisterna magna. The patient died on October 2, 1930.

ANATOMICAL FINDINGS

Gross: The brain was voluminous. On the base of the brain covering the ventral surface of the medulla and pons and extending into the interpeduncular space the meninges (pia and arachnoid) were thickened, opaque and intimately adherent to adjacent parts of the brain (fig. 2). The thick-

ened meninges could be followed onto the region of the cisterna magna, and from there to adjacent portions of the cerebellum. The dorso-lateral surface of the brain presented a fairly smooth meningeal covering. The appearance of the meninges at the base of the brain indicated an old standing process, probably a remnant of the meningitis which the patient had twenty years previously. It is significant that the thickened meninges,

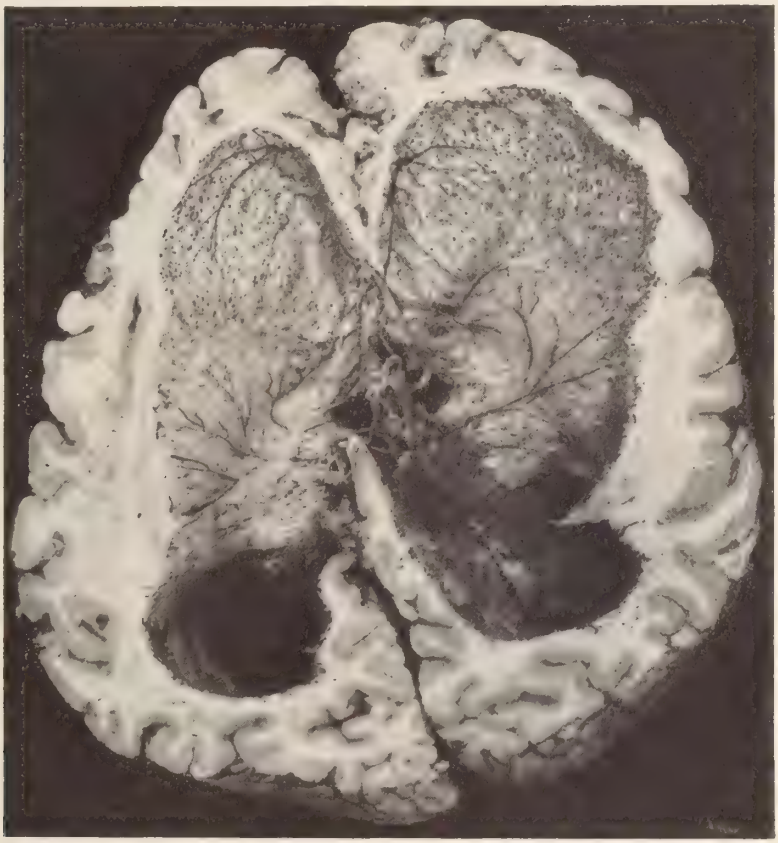


FIG. 2. Photograph, illustrating the enormous distension of the ventricles (internal hydrocephalus), the thinning of the cortex and underlying subcortex (pressure atrophy), and the numerous hemorrhages in the thickened ependymal lining of the ventricles (ependymitis).

though limited in extent, were found in the areas where obstruction blocks the main pathway through which ventricular fluid is drained and redistributed (fig. 1).

On sectioning the brain the ventricular cavities were exposed and found to be enormously enlarged, with the septum pellucidum fenestrated to provide a wide communication between the two lateral ventricles. The

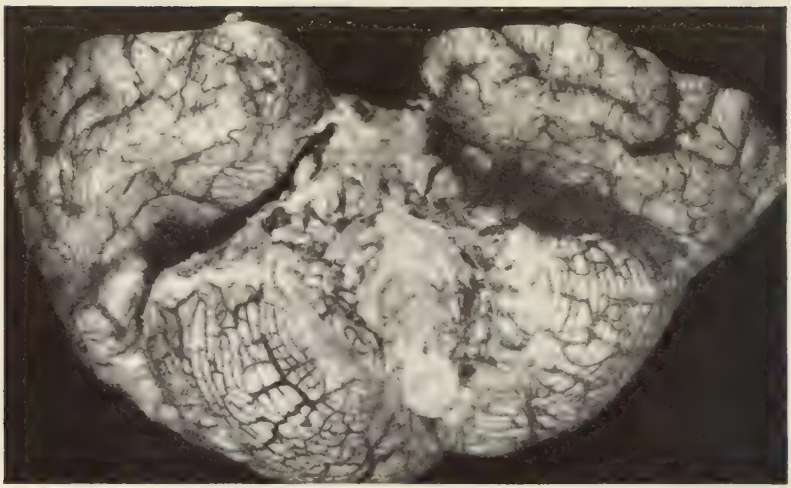


FIG. 3. Photograph, illustrating the thickened, opaque piarachnoid membrane at the base of the brain, the residuum of the old meningitis.



FIG. 4. Photomicrograph, illustrating the microscopic alterations in the ependymal lining and subependymal zone. The ependymal epithelium is completely lost. Hemorrhagic and leucocytic infiltrations are numerous in the subependymal zone.

ventricles were filled with a sanguino-purulent fluid. The ventricular lining, the ependyma, was irregular and granular in appearance. It was dotted by numerous brownish-red elevations and had the appearance of a hemorrhagic membrane (fig. 3).

Microscopic: Sections through the wall of several positions of the ventricles presented uniform pathologic alterations. The ependymal epithelium was desquamated, revealed in the subependymal zone numerous hemorrhages, diffuse and perivascular leucocytic infiltration, all the ear marks of an acute sanguino-purulent inflammation (fig. 4).

A section of the medulla oblongata at its lower limits indicated the likelihood that prior to the recent infection there was a small part of the subarachnoid space about the medulla open and communicating with the ventricles. Since it was now found filled with purulent material, obviously some of the intraventricular infectious material found its way into the partially open subarachnoid space and completed its obliteration.

COMMENT

The significant facts in the patient's history were (1) the existence of a large head at birth, (2) the normal and intellectual development until the age of eight years, (3) the sudden development of some acute infection of central nervous system reported as "brain fever" at the age of eight years, which was followed by loss of vision, paralysis of the left leg and arrested mental development; and (4) finally, the recent onset of upper respiratory infection which ushered in frank manifestations of central nervous system.

In reaching a clinical diagnosis of ependymitis the above facts were interpreted as follows:

1. The existence of a large head was not considered as part of the clinical picture, unless it could be assumed that a developmental defect in the character of an unsplitted piarachnoid preëxisted the "brain fever" at the age of eight years.

2. The normal mental and physical development of the patient until the age of eight years, however, excluded the preëxistence of the above condition.

3. The "brain fever" was, of course, considered as some form of meningitis with recovery which was followed by obliteration of the major part of the subarachnoid space resulting in internal hydrocephalus, blindness, arrested mentality.

4. The presence of manifestations of an inflammatory disease of the central nervous system, in view of an obliterated subarachnoid-space, lead to the conclusion that the infection could not spread to the piarachnoid covering the brain and, hence, was anatomically limited to the ependymal lining the subjacent brain tissue and to the subarachnoid space enveloping the cord. Thus the diagnosis of encephalo-ependymitis was arrived at.

The case illustrates well, that the knowledge of the anatomical organiza-

tion which provides for the formation, distribution and reabsorption of cerebrospinal fluid made possible the clinical recognition of the existence in this case of a so-called primary ependymitis, which is usually recognized only at post mortem examination.

The case also serves to provide further proof that a patent subarachnoid space is essential in order to maintain the balance between the production and elimination of cerebrospinal fluid; the occlusion of this space leads to internal hydrocephalus. It also points to the probability that the chorioid plexus often serves as a channel of infection. Under normal circumstances the infectious material is carried by the cerebrospinal fluid through the usual channels into the meningeal space, causing under certain conditions localized or widespread meningitis. With the subarachnoid space obliterated the infection is limited to the ependyma, resulting in the so-called primary ependymitis.

REFERENCES

Globus, Joseph H.: Communicating Hydrocephalus; So Called Idiopathic Hydrocephalus. Am. J. Dis. Children, 36: 680, 1928.

Globus, Joseph H., and Strauss, Israel: Subacute Diffuse Ependymitis, Arch. Neurol. and Psychiat., 19: 623, 1928.

ABSTRACTS*

Acute Obstruction of the Duodenum due to Submucous Hematoma. Gordon D. Oppenheimer. Ann. Surg. 98: 192, August 1933.

An unusual case of acute duodenal obstruction is presented. The patient, a 43 year old woman, ceased after an exploratory laporatomy for acute abdominal signs. At postmortem, the following were found:—complete duodenal obstruction due to a submucous hematoma; a small adeno-carcinoma of the head of the pancreas infiltrating the duodenal wall with dilatation of the pancreatic ducts with metastasis to a paratracheal lymph node; acute dilatation of the stomach (3500 cc.) with tension ulcer; and acute pancreatitis with fat necrosis. Only two other cases of duodenal obstruction due to hematoma were found recorded in the literature.

The Circulation Time in Various Conditions Determined by the Use of Sodium Dehydrocholate. B. S. Oppenheimer, R. V. Sager and L. Tarr. Am. Heart J. 8: 766, August 1933.

Using the intravenous injection of Sodium Dehydrocholate the authors determine by the bitter taste, the velocity of blood flow or circulation time. There is a marked prolongation of the time in congestive heart failure, and a decrease in Graves' Disease. The procedure is of value in detecting the presence of heart failure or Graves' Disease in conditions which might otherwise mask either. The circulation time in many other conditions is determined and discussed.

Lycopodium Granuloma, Its Clinical and Pathologic Significance, together with a Note on Granuloma Produced by Talc. William Antopol. Arch. Path. 16: 326, August 1933.

Six cases are described, in which granulomatous lesions, grossly resembling tuberculosis or neoplasm were produced by the surgical use of dusting powders containing the spores of lycopodium as an ingredient. The lesions may be confused with tuberculosis, but the Ziehl-Neelsen stain shows the presence of the acid fast spores of lycopodium.

Anomalous Origin of the Left Circumflex Coronary Artery. William Antopol and M. A. Kugel. Am. Heart J. 8: 802, August 1933.

In three hearts, the circumflex coronary artery arose from the right sinus of Valsalva, posterior to the origin of the right coronary artery. This vessel "hugged" the root of the aorta, finally emerging between it and the left auricular appendage, resuming its course in the bed normally occupied by the left circumflex coronary artery. In a 4th case, a similar artery arose as a branch of the right coronary artery 1 cm. from its ostium.

Prognosis in Gonococcal Endocarditis. Albert B. Newman. Am. Heart J. 8: 821, August 1933.

A complete survey of reported cases of recovery in gonococcal endocarditis is made. A case of gonococcal endocarditis which developed following a curettage is reported. It ran a long septic course with incidental focal glomerular nephritis and peripheral embolic lesions. The patient made a spontaneous recovery with a residual mitral and aortic insufficiency.

* Authors' abstracts of papers published elsewhere by members of The Mount Sinai Hospital Staff.

The Hydrogen Ion Concentration of the Topical Preparations Commonly Employed in Dermatology. Oscar L. Levin and Seymour H. Silvers. Arch. Dermat. and Syph. 24: 149, August 1933.

By means of the quinhydrone-electrode-potentiometer, the hydrogen ion concentration of numerous preparations employed in cutaneous medicine was determined.

As a result, it was found that the reactions of various topical preparations varied very widely.

Future Rôle of Preventive Medicine. Bernard Sachs. Health Examiner. 3: 17, August 1933.

Faulty obstetrics, tainted heredity, neurotic early environment, alcoholic or sexual excesses, and the infectious diseases of the central nervous system are regarded as preventable causes of nervous and mental disease. Among the latter the early recognition of syphilis followed by intensive treatment has made the progressive luetic dementias less common.

Production of the Anginal Syndrome by Induced General Anoxemia and Induced General Anoxemia causing S-T Deviation in the Electrocardiogram. Marcus Rothschild. Am. Heart J. 8: 729, August 1933.

Anoxemia was induced by rebreathing in 26 subjects with angina pectoris (impaired coronary circulation). Eighteen experienced an attack of precordial pain identical with their spontaneous attacks. Twenty control subjects did not develop pain.

Anoxemia is in part responsible for the pain of angina pectoris.

The response to induced anoxemia is of value in the diagnosis of impaired coronary circulation.

Electrocardiograms of 38 individuals were taken during the induction of progressive anoxemia. Eleven subjects developed deviation of the S-T segment. Eight of the 11 suffered from impaired coronary circulation with pain, and 3 did not.

The degree of deviation of the S-T segment was related to the degree of anoxemia.

The electrocardiographic changes produced by induced anoxemia are not diagnostic of impaired coronary circulation, but are suggestive.

Gastritis and Duodenitis in Relation to the Ulcer Problem. A Study of 124 Cases of Partial Gastrectomy. Paul W. Aschner and Sidney Grossman. Surg. Gynec. & Obst. 57: 334, September 1933.

Gross and microscopic lesions of the mucosa in 14 gastric ulcers, 70 duodenal ulcers, 11 cases without true ulcer, and 25 secondary cases (previously operated upon for ulcer) are described. Erosions were recognized macroscopically in 30 per cent, microscopically in 64 per cent.

The following conclusions are drawn:

1. Ulcer does not occur in a normal gastric or duodenal mucous membrane.
2. Gastritis and duodenitis precede the development of ulcer and predispose to it.
3. Gastritis and duodenitis is a disease which passes through acute, subacute and chronic stages with recrudescences. True ulcer may not develop, but when it does it is a phase of the process.
4. The factors responsible for the development and persistence of the chronic callous ulcer are not well understood.
5. Ulcers may heal spontaneously, or as a result of treatment or surgery, but the underlying gastritis and duodenitis may persist and predispose to renewed ulceration.
6. Determination of the etiologic factors in gastritis and duodenitis seems to us a necessary precursor to discovery of the basic cause of ulcer.

Purpura Annularis Telangiectodes. Oscar L. Levin and Jesse A. Tolmach. Arch. Dermat. & Syph. 28: 384, September 1933.

Studies of inflammatory diseases of the small blood vessels in the skin have consistently pointed to some general toxic agent as the underlying factor. A case of purpura annularis telangiectodes with autopsy was observed. The opportunity of correlating the pathologic changes in the other organs with those of the skin prompted the report of this case.

As a result of this observation it was found that purpura annularis telangiectodes is apparently a cutaneous manifestation of general cardiovascular disease.

Biliary Antiseptics. Reuben Ottenberg. J. Infect. Dis. 53: 239, September 1933.

No substance excreted in the bile exhibits sufficient bactericidal power to be regarded as a useful biliary antiseptic. Mercurochrome and flumerin, the most promising of many substances tested, when injected intravenously into dogs and rabbits conferred on the bile of these animals a degree of bactericidal effect on gram negative organisms.

Periarterial Sympathectomy in Fractures. An Experimental Study. Ralph Colp, Haig Kasabach and Sigmund Mage. Arch. Surg. 27: 658, October 1933.

Experiments are described which show quite definitely that an increased vascularity results from periarterial sympathectomy and that this procedure accelerates bony union.

Experimental as well as clinical evidence would justify further trial of this operation in recent fractures in which union appears to be delayed, and particularly in regions in which delay in union is common.

The Intimate Relation between Ophthalmology and Neurology. Some Reminiscences. Bernard Sachs. Arch. Ophth. 10: 433, October 1933.

The author emphasizes the close relationship between ophthalmology and neurology and the importance of a knowledge of both fields to the specialist in either one. He also warns of the dangers of over-specialization, and urges the necessity of good grounding in general medicine. He advocates more thorough study of changes in the eyegrounds and stresses the importance of a careful analysis of abnormalities in pupillary responses, and the slighter weaknesses of ocular muscles.

Studies of the Mechanism of Pain in Peptic Ulcer. Emil Granet. J. Lab. & Clin. Med. 19: 47, October 1933.

The rôle of muscle tension, chemical irritation, and nerve compression in the mechanism of ulcer pain is discussed.

The importance in the problem of individual sensitivity to pain is stressed.

Studies in patients with ulcer in the active and remission stages show that (a) percussion tenderness (muscle tension and nerve compression) is present in 85 per cent of patients during the active period of the disease. This is a helpful sign in the physical diagnosis of ulcer. (b) Patients with typical ulcer history may be hypersensitive, hyposensitive, or normally sensitive to pain. (c) Patients with atypical ulcer symptomatology, however, are mostly hyposensitive to pain. (d) The Palmer Acid Test Meal (chemical irritation) is positive in the majority of ulcer patients during the active stage and negative in the remission stage.

Central neurinoma associated with tuberous sclerosis. J. H. Globus. Revue Neurologique, vol. 2, no. 1, pp. 1–24, July 1933.

The author discusses the genesis of the term "neurinoma" and points out that it is the most suitable term for that group of tumors described under the names of "spon-

gioblastoma unipolare," "spongioblastoma polare" and "peripheral glioma." He also shows that since nerve tracts of the cerebrospinal axis have an analagous structure to that of peripheral nerves, it is easy to understand why tumors in the internal portions of the central nervous system can have the organization and cellular structure resembling peripheral neurinomas.

Two cases of brain tumor are reported, the structures of which are characteristic of neurinoma and because the tumor was located within the central nervous system they are classified as central neurinomas. In each case there was associated tuberous sclerosis.

The first case was that of a girl, aged 14, who presented progressive loss of vision with signs and symptoms of increased intracranial pressure of six months duration. With the aid of a ventriculogram the tumor was localized to the region of the third ventricle. The patient died during a second craniotomy. Gross autopsy revealed a hard pearly white tumor eminating from the bundle of Vicq d'Azir. A few hard nodules were present in the parietal lobe. Microscopic study revealed the tumor to be composed of fibers running in parallel tracts and in different directions; frequently forming whorls. Special stains proved these to be myelinated nerve fibers. The nodules in the parietal lobe showed disorganization of the cortical structures with monstrous giant cells, characteristic of tuberous sclerosis.

The second case was that of a 15 year old girl with a rapid onset and course with signs of increased intracranial pressure. She had a convulsive seizure, went into coma, and ceased soon after subtemporal decompression. Autopsy revealed a cystic cavity in the basal ganglia on the right. Microscopic study of the cyst wall and adjacent tissue revealed the characteristic structure of neurinoma and also in the center of the mass a picture similar to that of spongioblastoma multiforme. Parts of the cerebral cortex contained giant and monstrous neuroblasts and spongioblasts typical of tuberous sclerosis.

Eleven cases of gliogenous tumors associated with tuberous sclerosis have previously been described by the author and some of his collaborators. The outstanding characteristics of these were; (*a*) the localization of the tumor to the basal ganglia; (*b*) the complexity of the undifferentiated neuroectodermal elements and (*c*) the coexistence of tuberous sclerosis.

According to the author the occurrence of glial tumors with tuberous sclerosis may be explained on a basis of faulty development of the central nervous system beginning early in embryonic life and provoked by an abnormal liberation of proliferative elements of the nervous system. Furthermore, if tumors of glial origin, the origin and structure characteristics of which may also be explained by the above theory, be studied more carefully, the structure of neurinoma may be recognized more often and patches of tuberous sclerosis may be found in undamaged areas of brain cortex.

Much significance is attached to the opinion of Verocay, Antoni and others who state that Von Recklinghausen's disease is an embryonal disturbance which affects the histogenesis of the specific elements of the central nervous system. The significance is that peripheral neurinomas arise from the undifferentiated glial cells which have emigrated from the neural crests, while central neurinomas arise from the cells of the neural crests known as lemnoblasts or cells formed from the sheath of Schwann, these cells having been arrested in an intramedullary position and when stimulated give rise to central neurinoma. An interesting observation in this connection is the work of Speidel concerning the evolution of Schwann cells in vitro, which bear a striking resemblance to the cell structure of neurinomas.

The author concludes that there is a close resemblance in spongioblastomas, tuberous sclerosis, neurinomas and probably also in the neurofibromatosis of Von Recklinghausen's disease. All of these diseases are apparently due to a disturbance in the differentiation of cellular elements of the central nervous system and which can be designated under the name of neurospongioblastosis disseminata.

VOLUME 1 JANUARY-FEBRUARY, 1935 NUMBER 5

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

THE FIFTIETH ANNIVERSARY OF THE BEGINNING OF LOCAL ANESTHESIA

JULIUS WOLFF, M.D.

To Carl Koller, who for many years was actively associated with the Ophthalmological Department of The Mount Sinai Hospital, the designation of "Father of Local Anesthesia" can veritably be applied.

The epochal occasion on which the practical application of the local anesthetic effect of cocaine was first demonstrated by Koller to the medical profession was in September 1884 at the meeting of the German Ophthalmological Congress at Heidelberg. As this fall marked the fiftieth anniversary of this memorable event, it has been recalled to the attention of our profession by action taken by the Academy of Ophthalmology and Oto-Laryngology and by several contributions to the medical journals. As a further testimonial of appreciation of our former colleague, the Editor of this Journal has asked me to contribute a few informal personal remarks and accordingly I called on Koller to obtain directly from his own lips the story of his achievement.

In 1884 Koller was conducting some scientific experiments, collaborating with Freud, the noted psychologist. The latter asked him to test the effects of various substances on muscular fatigue, among them cocaine. These experiments brought no results, but in conducting them Koller swallowed some cocaine and observed the numbing effect on the lips and mouth. It has been stated that Freud suggested to Koller to test the anesthetic properties of cocaine on animals, but this was not the case. Koller made these experiments on his own initiative, instilling cocaine into the eyes of a frog, guinea pig and then into his own eye. Previous to this time, at the suggestion of Professor Arlt, Koller had tested numerous other substances in the search for a local anesthetic, to replace general anesthesia which had been found to be unsatisfactory for cataract operations, but was not successful. Koenigstein, another Viennese oculist, having observed the vasoconstricting effects of cocaine used an alcoholic solution in experiments to find therapeutic uses for cocaine in trachoma and other conditions, but did not consider its anesthetic properties.

Although Niemann and others, many years before Koller's experiments,

had noted the numbing effects of cocaine on the tongue when tested, no use had been made of this knowledge, and it was Koller's recognition of the usefulness of this drug as an available local anesthetic in operative work that constitutes his outstanding service to ophthalmology and to surgery in general. With keen insight Koller also suggested the use of cocaine in rhinological work to Jellinek who introduced it as a local anesthetic in this field. Within a few weeks after the demonstration at the Heidelberg meeting reports of the successful use of cocaine in ophthalmic operations came from many European clinics, as well as from this side of the Atlantic.

Koller, therefore, showed early in his career those conspicuous scientific qualities which, during my years of association with him at The Mount Sinai Hospital, I was able to observe very directly, namely: a keen power of observation, a constant desire to find improved methods and to turn to practical use any observations that he made. At the same time he was guided by minute attention to detail and a scrupulous accuracy and truthfulness in any claims that he made.

Doubtless it was the early exercise of these qualities that resulted in his valuable contribution to humanity, and that will make his name live in the annals of the history of medicine.

A CASE OF ENDOMETRIOSIS WITH POLYPOID INVASION OF THE VAGINA

S. H. GEIST, M.D.

[*Service of Dr. R. T. Frank*]

In recent years the subject of endometriosis has received considerable attention. Sampson of Albany particularly emphasized the frequency of this condition and has published excellent articles dealing with its clinical, pathological, and etiological aspects.

The disease occurs in women usually between the ages of puberty and the menopause. The findings vary considerably depending on the site of the lesion. The process may involve the uterine wall, i.e., the myometrium, its peritoneal surface or both; the ovaries which are a common site of the disease; and the other pelvic viscera, such as the rectum, sigmoid, and the pelvic peritoneum itself. At times structures similar to that found in the pelvic organs occur in the inguinal glands and occasionally in laporatomy scars. The lesions grossly may appear as small bluish or mulberry-like tumors from a pinhead in size to cysts measuring 15 to 20 c.c. in diameter. These cysts contain bloody fluid and are almost always ovarian in situation. They are the so-called "chocolate cysts" encountered in pelvic surgery. At times the lesion in the pelvis due to its chronicity, and possibly to a local irritative reaction, causes a massive production of fibrous tissue so dense that cartilaginous masses of adhesions cementing the pelvic organs together, similar to the so-called "frozen pelvis" of Cullen, result. The lesions have marked invasive tendencies but, unlike a malignant growth, do not metastasize in the usual sense of the word, or cause cachexia.

The histologic examination of the tumor tissue reveals structures resembling the normal uterine mucosa. Occasionally these areas are surrounded by dense fibrous tissue, while at other times they occupy the centre of cytogenic zones, resembling uterine stroma. It is also noted that the endometrial-like tissue takes on the appearance of menstruating mucosa if the patient is menstruating. It seems that this tissue reacts to the same hormonal influence as the uterine mucosa.

The etiology of the condition has as yet not been satisfactorily determined. Sampson is a very strong advocate of the "regurgitation" theory. He believes that fragments of normal mucosa due to the contraction of the uterus and possibly to antiperistaltic waves in the tube are carried through the tube and are implanted on the peritoneal surface of the various pelvic organs. This transplantation takes place during the menstrual

period. Other investigators, however, believe that the lesion is one of metaplasia due to some influence, possibly endocrine or inflammatory or both; that this metaplasia affects the epithelial elements of the peritoneum, and that these cells either assume the function and appearance of Mullerian tissue or mimic it. Another theory as to etiology is the "metastatic" one which assumes the deposition of epithelial uterine fragments in distant organs by way of the lymphatic or blood channels. A combination of the regurgitation and metastatic theory has been suggested to explain the involvement of such distant organs as the inguinal lymph nodes in combination with pelvic lesions. The appearance of the lesion in abdominal scars is due to direct implantation attendant upon the traumatism of operative procedures that involve the uterine mucosa.

The symptomatology of the condition is not always characteristic. However, when the uterine musculature is involved, dysmenorrhea and metrorrhagia are the commonest symptoms.

The pelvic findings naturally depend on the organs involved and the extent of the lesion. There is, however, one finding that if present is practically pathognomonic, namely the occurrence in the vagina of single or multiple, small, pinhead-sized cysts that can be felt and seen under the mucous membrane. These usually are situated in the posterior fornix. They have a deep blue color and have been termed "blue domed" cysts.

The treatment varies. Operative removal is performed when possible though extensive intestinal resections are no longer believed necessary. It has been shown that castration, even with an incomplete operation, will prevent any further progress of the disease. Radium, too, has been advocated, and good results from its use have been reported.

The case to be described presents an unusual type of involvement of the vagina and an extensive invasion of the rectum without having given rise to symptoms.

CASE REPORT

History (H. N. 292358). A young woman, aged 26 years, entered the hospital June 30, 1928. Her menstrual periods began at fourteen years of age, were regular every twenty-eight days, lasting about five days with moderate flow and no pain. About one year prior to admission to the hospital she was curetted for menorrhagia at another hospital, where the diagnosis of incomplete abortion was made but not proved. The operative procedure did not cure or improve the patient. During the following year her periods lasted eight to fourteen days. They were marked by the passage of large clots, unaccompanied by pain. There was no intermenstrual bleeding and no other symptoms.

Physical examination. The cervix, uterus, and adnexa seemed normal. Just behind and to the right of the cervix was a tri-lobe polypoid mass (fig. 1), apparently arising or perforating through the vaginal mucosa.

The vaginal portion of the mass resembled congeries of worms, the longest one measuring about two inches. They were extremely soft, friable, and brilliant red in color, lying free in the vagina except at one point of attach-



FIG. 1. Polypoid mass perforating through the vagina just below and to the right of the cervix. The line drawing shows its extension from posterior cervico-uterine wall into vagina.

ment and bleeding on manipulation. There were no other pathologic findings.

Course. The diagnosis of endometriosis was made and the entire mass was avulsed. The histological examination of the specimen confirmed the diagnosis of endometriosis (fig. 2).

The patient was again seen eighteen days later. Since the last examination she had had a menstrual period which was very profuse. At this time it was found that the vaginal growth had recurred in exactly the same form and practically to the same extent. As the patient was soon to begin to menstruate, a biopsy only was performed, and the patient was discharged with the recommendation that she return after her period was finished. She came back about three weeks later. At this time the mass was excised and the base cauterized with the actual cautery. Six months later (December 10, 1928) as her condition showed little improvement, she re-entered the hospital. She now showed, in addition to the polypoid

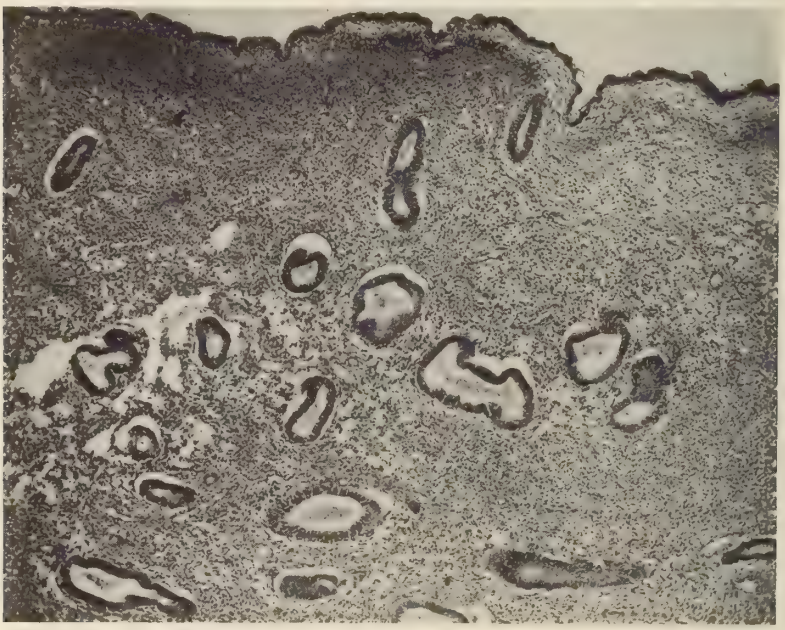


FIG. 2. Section through the polypoid vaginal masses showing typical endometrium composing them.

mass in the vagina, a thickening of the recto-vaginal septum and slight roughening of the posterior wall of the uterus. The polyps were again excised and the base again cauterized. A supravaginal hysterectomy and bilateral-salpingo oorphorectomy was performed. Because of its attachment to the rectum, the cervix was left in situ. The posterior portion of the uterus just above the cervix showed some slight irregularities. The rectum was greatly thickened, the wall rigid and inelastic. The recto-vaginal septum was densely hard and cartilaginous in consistency. The right ovary contained a small "chocolate" cyst about 3 cm. in diameter.

Histologic examination of the polyps showed the typical endometrial-

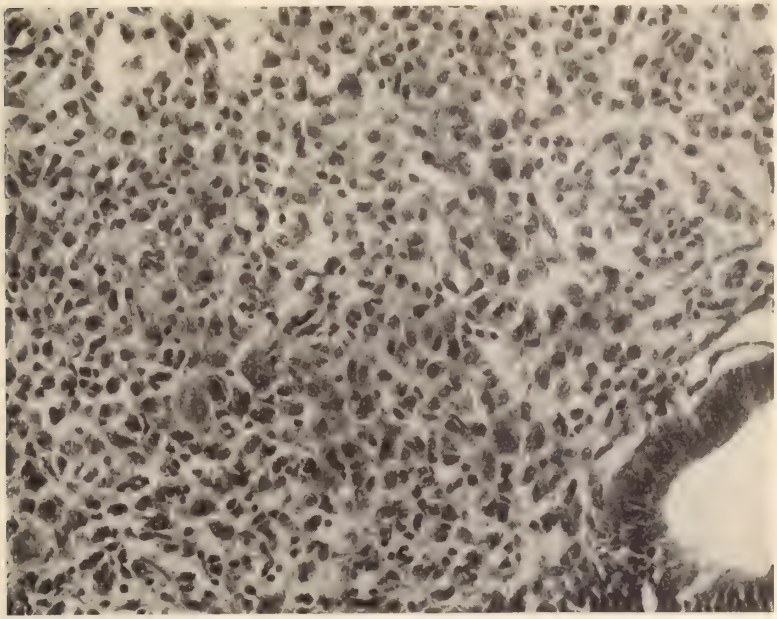


FIG. 3. Decidual reaction in the stroma of the tissue comprising the polypoid growths

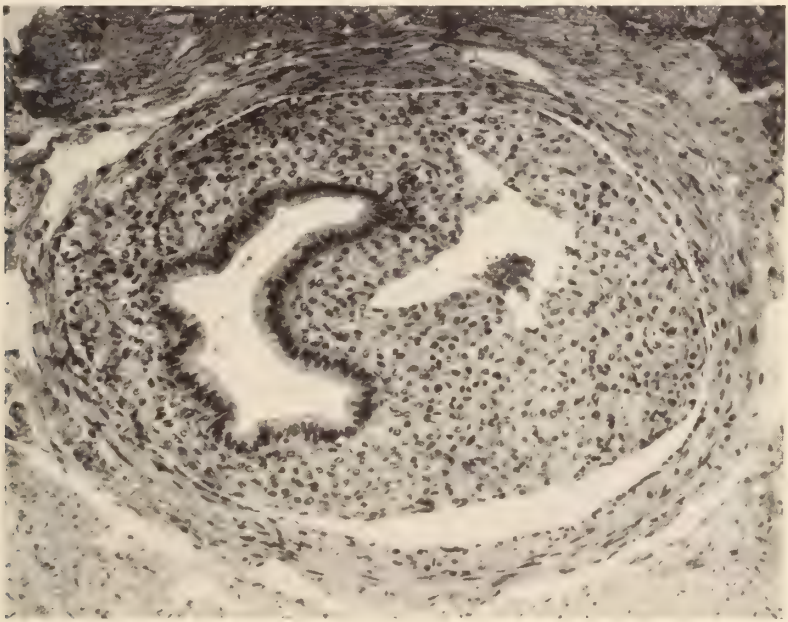


FIG. 4. Endometrial-like gland and stroma in a lymph vessel

like tissue with a very decided decidual reaction in the stroma (fig. 3). The posterior uterine wall showed invasion by endometrial-like structures. In one area a gland-like structure with its surrounding stroma seemed to be lying in a lymphatic vessel (fig. 4).

The presence of the gland-like structure in a lymphatic vessel tends to support the possibility of its metastatic origin, for it is conceivable that such a fragment might easily be transported and deposited at some distant site and grow of its own potentiality or under the stimulus of an ovarian hormone. The small hemorrhagic cyst showed no tissue resembling endometrium.

The patient made an uneventful recovery and has remained well up to the present time. She was last seen by me in my office in March, 1934.

MEDIASTINAL GUMMA WITH ULCERATION INTO THE TRACHEA

FREDERICK H. KING, M.D.

[*Service of Dr. Harry Wessler and the Division of Laboratories*]

The literature contains a number of instances of gummatous involvement of the mediastinal lymph nodes. Cases have been cited of involvement of these nodes in association with syphilitic disease of the trachea. Examples of isolated specific disease of the latter are numerous. However, instances of ulceration into the trachea by a paratracheal gummatous mass are few. The rarity of this condition and the diagnostic problem involved warrant the presentation of the following case.

CASE REPORT

History (H. N. 365599). The patient, a 45 year old white male, was admitted to the hospital on April 30, 1934 complaining of cough, difficulty in breathing, fever and sweats for three weeks and foul breath of two weeks duration. He stated that at the age of nineteen he had had a specific urethritis and that the Wassermann reaction of the blood was negative at that time. He was unaware of a syphilitic infection.

Until six weeks prior to admission he enjoyed good health but at that time developed sneezing and rhinorrhea, interpreted as being due to an upper respiratory infection. After three weeks, however, he began to have persistent and severe cough which was productive of half a cupful of yellowish brown mucoid sputum daily. There was an elevation of temperature ranging from 99° to 101.5°F., and there were associated night sweats. Two weeks before admission his breath became foul and general weakness and anorexia developed. His respiration became wheezing in character, most marked during inspiration. When the difficulty in breathing became alarming, hospitalization was advised.

Examination. At the time of his admission the patient was acutely ill, breathing with an inspiratory and expiratory stridor and coughing up foul sputum. He appeared slightly cyanotic and his temperature was 101°F. The trachea was fixed. Examination of the chest disclosed widened retromanubrial dullness. There were coarse rhonchi and sibilant râles throughout both lungs. The heart was not enlarged; the aortic second sound was louder than the pulmonic, and the blood pressure was 190 systolic and 85 diastolic.

The sputum was mucopurulent and on smear failed to reveal tubercle bacilli. A blood count showed a slight leucocytosis. The Wassermann reaction of the blood was four plus.

It was felt that the patient was suffering from tracheal compression due to a mediastinal mass and the roentgenogram of the chest was in conformity with this impression, for it showed a widening of the superior mediastinum above the level of the aortic arch. In addition, the X-ray revealed a lobular pneumonia of contiguous portions of the right upper and lower lobes and of a portion of the left lower lobe.



FIG. 1. Trachea showing ulcer with protruding gummatous mass

To ascertain further the nature of the tracheal stenosis, bronchoscopy was done. The trachea at its lower portion appeared narrowed to one-half its normal diameter, and in its right anterior wall at 21 cm. from the incisor teeth, a large irregular ulceration was found which had the appearance of an ulcerated carcinoma. The left bronchus was displaced to the left and narrowed by pressure on its medial wall. Foul pus exuded from the bronchi. Bronchoscopy was repeated and a flapping mass of tissue was removed from the ulcerated area. The biopsy specimen, ex-

amined by Dr. Klemperer, was found to consist of necrotic tissue and cartilage with colonies of higher bacteria within it. This finding failed to corroborate the impression that the lesion visualized by bronchoscopy was an ulcerating carcinoma of the trachea.

The temperature fluctuated between 102 and 103 degrees. The stridor became progressively more marked; the cyanosis increased, and the patient died on the fifth day after admission.

Necropsy findings. (Autopsy performed by Dr. Gitlitz and Dr. Bernheim.) Of primary interest were the findings in the trachea and mediastinum. The mucous membrane of the upper part of the trachea was

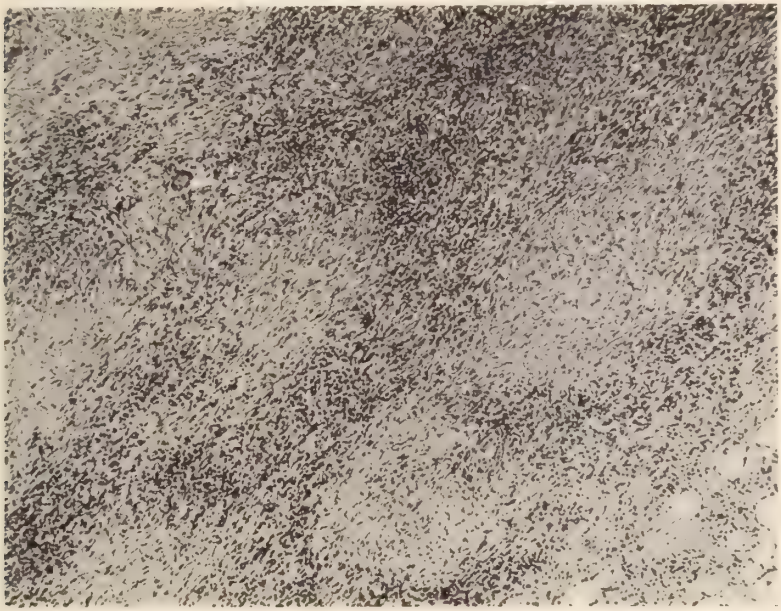


FIG. 2. Section stained with haematoxylin and eosin showing miliary gummata. Photomicrograph × 35.

whitened and wrinkled. Elsewhere it appeared congested. A small ulcerated area near the bifurcation was noted. In the right antero-lateral wall of the trachea at 7.5 cm. below the true vocal cords there was an oval ulcer 5 cm. long and 2 cm. wide, the edges of which were frayed, grayish-green in color, and showed on two sides the ends of three eroded cartilaginous rings (fig. 1). Forming the floor of the ulcer was a necrotic, grayish-green, foul smelling material. This covered that surface of a juxtatracheal mass which had penetrated into the tracheal lumen. The mass extended outward into the mediastinum for about 2 cm. Its consistence was firm and section disclosed a homogeneous surface with a grayish-white periphery and a yellow center, mottled with anthracotic pigment. The

tracheobronchial lymph nodes were moderately enlarged and firm. On section they were slate colored and were spotted with very small yellowish foci.

The lungs were the seat of a diffuse bronchopneumonia involving all the lobes. A small encapsulated caseous focus (Puhl's "reinfect") was present in the left upper lobe. The bronchi were cylindrically dilated to a slight extent and contained turbid mucus.

The heart showed only dilatation of its chambers. In the ascending aorta there were numerous wrinkled, translucent areas of grayish color. In the arch there was a moderate degree of arteriosclerosis. The spleen showed acute infectious swelling. Calcified tubercles were present in the spleen and liver.

A smear of the small caseous focus in the left upper lobe did not show acid-fast bacilli. There were gram positive and gram negative bacilli in the mucopurulent material from the left upper-lobe bronchus. In a smear made from the necrotic floor of the tracheal ulcer there were present, in addition to such organisms, numerous fusiform bacilli.

Microscopic sections of the trachea showed evidence of chronic inflammation. In many areas the epithelium of the mucosa had undergone squamous metaplasia. One section showed a small surface ulceration. The base of this ulcer was formed by necrotic tissue which extended deep into the tracheal wall. In close proximity to this caseous area there was a small nodule composed of epithelioid cells and an included giant cell. The edges of the large ulcer were extensively necrotic and contained many bacteria. The paratracheal mass was found to consist of large areas of necrosis, lymphoid tissue, and granulation tissue—the latter being composed of fibroblasts, small vascular channels, occasional giant cells, lymphocytes, and plasma cells. An occasional arteriole within the granulation tissue showed endarterial proliferation. Neither in the granulation tissue nor in the large necrotic areas in proximity to it could tubercle bacilli be found after prolonged search. The microscopic picture of the mediastinal mass just described was only suggestive of syphilis. A characteristic picture of syphilitic inflammation, however, was found in the peripheral portion of one of the smaller mediastinal nodes where the histologic conformation was that of miliary gummata (fig. 2). No bacteria were found in this tissue. It was not possible to demonstrate the presence of Spirochaeta Pallida after staining by the Levaditi method.

A further unequivocal manifestation of visceral syphilis was a characteristic lesion of luetic aortitis, one section showing disruption of the elastic fibres of the media by a gummatous nodule. Spirochaetes were not found in this lesion.

COMMENT

The clinical features of this case are entirely explained by the findings at necropsy. A reconstruction of the course of events from these findings

would indicate that the patient suffered comparatively little respiratory difficulty from compression by the paratracheal mass until the latter eroded the adjacent tracheal cartilages, causing a destruction of the framework of the trachea and leading to a considerable collapse at that point. The necrotic floor of the ulcer became infected with various organisms present in the trachea, including anaerobes. Infection of the trachea and bronchi with the latter led to the production of the fetid mucopurulent sputum described.

The presence of smaller ulcerations of gummatous character point to the initial involvement of the trachea by the syphilitic process with subsequent gummatous infiltration of the paratracheal lymph nodes. It is practically certain, however, that the large ulcer was not the resultant lesion of a necrotic tracheal gumma but that the paratracheal gummatous mass ulcerated secondarily into the trachea. This is supported by the gross appearance of the ulcer, the older age of the mediastinal mass and the short duration of symptoms of tracheal irritation, such as cough and expectoration.

This case demonstrates the difficulty in making a diagnosis of syphilis involving the trachea. The lesion may closely resemble an ulcerating carcinoma, as in this case, or it may have the appearance of an ulceration caused by the penetration of a tuberculous lymph node. With the aid of bronchoscopy and biopsy examination these two conditions can in most instances be ruled out. After this has been accomplished, it is most logical, as this experience teaches, to entertain the diagnosis of syphilis if the Wassermann reaction is positive. An early diagnosis of syphilis involving the trachea may lead to a cure.

REFERENCES

Conner, Lewis A.: Syphilis of the Trachea and Bronchi. Am. J. M. Sc., 126: 57, 1903.

Hart, K., and Mayer, E.: In Handbuch der speziellen pathologischen Anatomie und Histologie (Henke-Lubarsch). Berlin, Julius Springer, 3: 406, 1928, part I.

Nicolai, Ernst: Die Syphilitischen Erkrankungen der Luftröhre v. Volkmann's Samml. Klin. Vortr., 1919, p. 781.

Sternberg, C.: In Handbuch der speziellen pathologischen Anatomie und Histologie (Henke-Lubarsch). Berlin, Julius Springer, 1: 302, 1926, part I.

UNRECOGNIZED BRONCHOPLEURAL FISTULA OF EIGHTEEN YEARS' DURATION

SAMUEL H. KLEIN, M.D.

[*Services of Dr. H. Wessler and Dr. H. Neuhof*]

The history of an acute pulmonary infection and empyema, followed by long periods of well being, alternating with acute exacerbations of the empyema accompanied by cough and purulent expectoration presents a clinical picture almost pathognomonic of bronchopleural fistula. Its recognition and treatment by complete unroofing and drainage of underlying diseased tissue is responsible for the probable permanent cure in the following case.

CASE REPORT

History (H. N. 363655). The patient, a salesman thirty years old, was admitted to the hospital on March 14, 1934, complaining of pain in the right chest and fever of thirteen days' duration, cough for nine days, and bloody sputum for one day.

His present illness began originally eighteen years ago (at the age of twelve) with a right sided "pneumonia" which was followed by empyema. The pleural cavity was drained by intercostal incision, and the acute symptoms subsided. However, superficial abscesses developed in the chest wall, and he was told that one of the ribs was involved in the suppurative process. Similar abscesses, accompanied by febrile reaction, appeared periodically during the next two years so that the patient underwent another operation at which resection of three ribs was performed.

He was quite well for two years. The wound was well healed, and there was no fever, pain, cough, or expectoration. However, these symptoms reappeared, and a localized empyema was once more surgically drained.

Two more years of good health ensued. Then the scar broke down, and pus was discharged spontaneously for about two weeks, after which the wound again healed and there was complete absence of symptoms.

A similar episode occurred four years later, and an operation was again performed. The patient is vague about the details of this operation, but he believes that no ribs were removed and that the wound was closed without drainage He recovered completely and was then asymptomatic for eight years, during which period he was working actively.

Thirteen days before the present admission the patient was taken ill with sharp pain in the right chest anteriorly, aggravated by respiration, and with fever of 101° to 103°F. Cough began four days later, dry and hacking for four days, then productive of one-half cupful of white mal-

odorous sputum daily. On the day before admission, following an attack of coughing which lasted fifteen minutes, about two ounces of bloody sputum "gushed out." His temperature varied from 99°F. in the morning to 102° and 104°F. at night. He had no chills.

Physical examination. The patient was a well developed and well nourished young man. He was coughing but was comfortable and did not appear acutely ill. The temperature was 100.4°F., pulse 80, and respirations 30 per minute. The trachea was shifted to the right but was freely movable. The right chest was depressed posteriorly and inferiorly at the site of the previous operations. Pulmonary expansion on this side was limited. There was dullness over the right chest from the apex down to the third rib anteriorly and fourth vertebral spine posteriorly with diminished breath sounds. There were râles in the right axilla posteriorly. The left chest revealed no abnormal physical signs. The fingers were not clubbed.

Laboratory findings. Blood pressure, 100 systolic and 70 diastolic; hemoglobin (Sahli), 78 per cent; white blood count, 11,400; polynuclear neutrophils, 72 per cent; lymphocytes, 26 per cent; monocytes, 2 per cent. The urine examination and the blood Wassermann test were negative. Roentgen examination of the chest on March 14 showed a deformity due to the previous resection on the right side of the seventh, eighth, and ninth ribs with regeneration of bone and synostoses of the seventh and eighth ribs. Underlying these ribs was a marked thickening of the pleura which extended to the base and also mesially. There was also, probably, some infiltration of the right lower lobe. The appearance was considered suggestive of chronic empyema with, possibly, a secondary infection of the lung (fig. 1).

Course. Diagnostic punctures of the chest were made three days later in the right mid-axillary region and also posteriorly at about the level of the scapula. These were negative. Nevertheless, the diagnosis of a small localized empyema was still entertained.

Bronchoscopy on the 19th disclosed a small amount of non-fetid sputum in the right bronchus and dilatation of the right middle-lobe and lower-lobe bronchi. A narrowing of the lower lobe bronchus below the origin of the middle-lobe bronchus was considered to be due to distortion.

Bronchography was then resorted to in the hope of establishing a precise diagnosis and therapeutic indication. In the axillary portion of the right chest there was a small irregular area outlined by lipiodol which was due possibly to a dilated bronchus. In addition, there were seen a number of collections of lipiodol which lay parallel to the wall of the chest, the appearance of which strongly suggested that they were in the pleural cavity (fig. 2).

Operation. Operation was performed on March 30, 1934. The old scar was excised and aspiration performed through the fibrous tissue in

the hiatus between the sites of the previous rib excisions. Air was immediately obtained. A tract was split open which led directly into a semicircular cavity about one-half inch in diameter, situated superficially in the lung, with free bronchial communication. The cavity communicated with a narrow pleural cleft which could be traced downward and forward and which contained mucopurulent material and granulation tissue. Its parietal roof was an exceedingly dense and rigid membrane. This membrane was widely excised in order to completely unroof the



FIG. 1. Roentgenogram showing postoperative costal deformity of bone, the underlying marked pleural thickening, and infiltration of the right lower lobe.

cavity. The latter was found to measure about three by two inches. Upon inspecting the floor of the cavity two additional pulmonary lesions were found. One was an old abscess of the lung with free bronchial communication, about the size of the one originally described and located about one inch anteriorly and to the right. About one-half inch in front and above the second lesion was a slit-like defect with its small bronchial communication. These two additional ancient lung abscesses contrasted with the first that had been found in that their surrounding visceral pleura was much thicker and stiffer. Accordingly, the visceral pleura about them

was excised in order to make possible later collapse and healing of these lesions. The two large cavities in the lung were separately packed and the remainder of the wound was lightly packed with gauze. Tissue was removed at operation and sent to the laboratory for pathological ex-



FIG. 2. Bronchogram. Note two small collections of iodized oil lying parallel to the chest wall. They were thought to be in the pleural cavity, and hence suggested the existence of a bronchopleural communication.

amination. This was reported: "Chronic interstitial pneumonitis. Chronic fibrosing pleuritis."

The patient's convalesence was uneventful, and he was discharged from the hospital nineteen days after operation. The wound at that time was clean, was contracting satisfactorily, and presented the fistulous bronchial openings in its base.

When seen in the out-patient department on July 14, 1934, the patient was symptom-free. The wound was practically healed except for a tiny superficial area which required only epithelialization. There were no signs of bronchial fistulae.

COMMENT

The original diagnosis of pneumonia at the onset of the illness, eighteen years previously, was probably incorrect. It is more likely, as shown by subsequent events, that the patient had multiple acute lung abscesses which ruptured and produced an empyema. It is very interesting that the patient had such long periods of apparent good health with the thoracotomy wound well healed despite the presence of the chronic pulmonary cavities, pleural infection, and underlying pneumonitis. Striking is also the absence of roentgenologic evidence of pneumothorax in view of the fact that aspiration of the chest at operation revealed the presence of air in the empyema cavity. The passage of lipiodol from the bronchus into the empyema cavity also demonstrated that the bronchopleural communications were patent preoperatively.

A CASE OF ENCEPHALO-MYELO-RADICULITIS*

MOSES KESCHNER, M.D.

[*Service of Dr. Israel Strauss*]

Since the epidemic of influenza at the close of the World War a number of cases of acute involvement of the nervous system have been reported in which the clinical picture, with a few exceptions, was essentially similar. In not a few instances the cases occurred in epidemic form. In almost all cases the disease was ushered in by symptoms of an upper respiratory infection of varying intensity; as these subsided there appeared severe pains in the trunk and limbs followed rapidly by weakness or paralysis of the affected parts with corresponding changes in the reflexes and objective disturbances in superficial and deep sensibility. In many cases there were also evidences of involvement of the cranial nerves, especially those arising from the brain stem and in the cases in which the lower portions of the cord were involved, impairment of sphincteric control was noted. The spinal fluid showed no noteworthy abnormalities except perhaps an increase of globulin. The unusually severe cases died, but most of them recovered completely. The cases that came to necropsy showed evidences of an inflammatory process in the peripheral nerves, roots, cord, brain, and their coverings. In view of this and of the almost perfect restitution of function of the cases that recovered, they are thought to be due to an infection whose etiologic agent is as yet to be determined. Most observers believe the infectious agent to be allied to the viruses which produce the non-suppurative and non-toxic encephalitides and myelitides.

There is a great deal of controversy in the literature as to the causation, classification, and designation of this group of cases. It seems, however, that until such time as the precise etiologic agent will have been determined, the cases should be designated by employing the name of the part or parts of the nervous system involved, to which there should be attached the suffix "itis" as indicating that the process is inflammatory in nature. The following case, we believe, is one belonging to this group.

CASE REPORT

History (H. N. 348204). A policeman, 27 years old, white, was admitted to the hospital on January 22, 1933 with the following history: He was well until 13 days before admission, when, after unusual physical exertion and exposure, he developed general malaise, numbness in the soles of the

* Presented before the Clinical Conference of the Mount Sinai Hospital, March 24, 1933.

feet, and paresthesias in the legs. The next day the numbness spread above the ankles and also involved both hands. He was still able to walk although his legs felt weak and "heavy." He remained in this condition for the next three or four days, when he developed a "tickling sensation" in the throat and sharp pain in the temporal region. At about this time he noted that the left side of his face was flatter than the right and that the numbness and weakness in the legs ascended to the mid-thigh region and finally to the hips, compelling him to take to bed. Five days before admission he developed double and blurred vision, and sharp "knife-like" pains in the right pectoral region and in the lower spine radiating to both buttocks.

Examination. The patient was a well developed and well nourished individual who appeared acutely and gravely ill. He was unable to sit up or to turn around without assistance. Aside from some irritability and restlessness the mental examination disclosed no abnormalities. There was a slight rigidity of the neck and a bilateral Kernig. The motor power in the upper extremities was markedly diminished, and there was a complete flaccid paraplegia. The pupils were equal in size, regular in contour, and reacted promptly and equally to all stimuli. There was nystagmus on looking to the extreme right and also to the left. The fundi and visual fields (grossly tested) showed no abnormalities. The facial innervation showed marked weakness, peripheral in type, on the left side. The tendon reflexes were depressed in the upper extremities and absent in the lower, and the abdominal and cremasteric reflexes were unobtainable. There were no pathologic reflexes. Sensory examination showed a level at the twelfth thoracic dermatome below which there was slight diminution of pain and temperature and impairment of vibratory and postural sensibility. Tactile sensibility was unaffected. These sensory disturbances had been much more intense on the day before admission when the patient was seen in another hospital.

Lumbar puncture yielded clear cerebrospinal fluid under an initial pressure of 200 mm. of water; globulin, positive; sugar, 65 mg.; total protein, 130 mg.; 1 cell per cu. mm.; colloidal gold curve negative. Manometric studies revealed *complete block.*

All other laboratory data were negative.

Course. Two days after admission the patient developed shooting pains in the right upper extremity, and both hand grips became weak. Except for the disturbances in the sense of position in the toes of the right foot the objective disturbances had disappeared. The nystagmus became less constant. He was given a series of nineteen intravenous injections of typhoid vaccine. Gradual improvement began to be noted after the fifth injection. Two weeks after admission lumbar puncture revealed no block. The swelling of the cord had apparently subsided. He was also treated with faradic stimulation and daily exercises to the involved limbs

while in a hot bath. He was discharged a little over two months after admission and was able to walk out of the hospital with assistance. Examination on the day of discharge revealed the following positive findings: —The tendon reflexes in both arms were difficult to elicit; the abdominals and cremasterics were present and active; the patellar and ankle reflexes were absent, and there was slight weakness in the lower extremities. When seen four months later, he had regained completely the motor power in all extremities and the knee and ankle jerks were obtainable although they were very feeble.

COMMENT

The case was considered one of widespread infection of the nervous system involving cranial nerves, spinal roots, and cord. Whether the infection was due to a virus or some other similar agent can not be determined according to the present state of our knowledge. The presence of complete subarachnoid block followed by complete recovery of function must be assumed as indicative of a severe swelling of the cord which subsided following the recession of the "inflammatory" process. The absence of sphincteric disturbances in the presence of severe cord involvement producing a flaccid paraplegia is unusual and is a noteworthy feature in the case.

REFERENCES

Redlich, E.: Ueber ein Gehauftes Auftreten von Krankheitsfällen mit den Erscheinungen der Encephalomyelitis disseminata. Monatschr. Psych. u. Neurol., 44: 152, 1927.

Pette, H.: Zur Frage der Infektiosen Ätiologie der akuten disseminierten, Encephalomyelitis resp., multiple Sklerose. München med. Woch., 72: 1409, 1929.

Globus, Joseph H.: Inflammatory Disease of the Central Nervous System. Arch. Neurol. & Psychiat., 28: 810, 1932.

TRANSIENT BILATERAL ABDUCTOR PARALYSIS IN CORONARY ARTERY THROMBOSIS

DAVID BECK, M.D.

[*Services of Dr. B. S. Oppenheimer and Dr. R. Kramer*]

Transient bilateral abductor paralysis of as short duration as in the case to be described is probably very rare as no similar instance could be found in a fair survey of the literature.

The list of causes given for recurrent nerve paralysis is a long one. Those which could apply here are: (1) Cardiac failure, particularly in cases of mitral stenosis, where the left recurrent nerve is thought to be compressed between the aorta and the enlarged left auricle or the distended left pulmonary artery. In this group, however, only one case with bilateral paralysis has been described (Ortner). All other cases of cardiac origin have shown the left nerve only to be involved, but none of these were of such short duration. (2) There is also the unsatisfactory group of so-called idiopathic abductor paralysis. It includes 15 to 40 per cent of cases of unilateral and bilateral paralysis which have no cause at present demonstrable. Fortunately, the prognosis is best in those cases for which there is no obvious cause. (3) Toxic neuritis as in the case here reported in which possibility of "toxic" neuritis on the basis of an anoxemia due to cardiac failure is advanced.

CASE REPORT

History (H. N. 381187). The patient, a 49 year old white man, was admitted to the hospital January 4, 1934. Eight years previously his right leg had been amputated because of thrombo-angiitis obliterans. He had not used tobacco since then. One year ago he began to have attacks of percordial pain which usually occurred at night and awakened him from sleep. These pains radiated to the back and were accompanied by dyspnea. The attacks occurred at intervals of about six to seven weeks and lasted from one to two hours. Because of the lessened activity resulting from the loss of his leg, the relation of exertion to these precordial pains could not be properly estimated. Recently, with the advent of financial difficulties, the patient became very nervous and slept poorly. He was told that his blood pressure was "150." On the evening of admission he was suddenly seized with a severe attack of precordial pain associated with orthopnea.

Examination. When seen at the hospital several hours later, the patient was found to be moderately cyanotic, sitting up in bed, and having

severe dyspnea interrupted by deep gasps. He was exceedingly nervous. Closer observation, however, showed that there was no real orthopnea; in fact, when lowered to a semi-reclining position, his breathing seemed to be easier if the position were not too low. The chest was markedly emphysematous so that percussion outline of the heart was unreliable. The bases of the lungs showed signs of congestion. The heart sounds were very poor. The liver could not be felt, perhaps because the patient was stout and dyspneic. The radial vessels were moderately thickened, and the pulse beats were exceedingly small. The blood pressure was 90 systolic and 60 diastolic. An electrocardiogram showed a left ventricular preponderance and a cove plane T-1 and T-2. The Q.R.S. complex was slurred and definitely spread; and the fourth lead showed a positive T-wave.

Course. The extreme nervousness of the patient aroused the suspicion that his deep respiratory gasps were those of an hysterical hyperpnea with resultant alkalosis. What made this suspicion seem tenable was the fact that the patient, when requested to do so, was able to control his dyspnea to some extent, as, for instance, during the examination of his heart. In addition the administration of CO_2 and oxygen seemed to give him relief for considerable periods on several occasions. The CO_2 determination, however, was 69 volumes per cent. The systolic blood pressure dropped to 85. At times he was much more comfortable when lying at an angle of about 45°. Any relief, however, was temporary, and as the patient's periods of distress continued, a laryngological examination was requested. A bilateral abductor palsy was reported, and a tracheotomy was decided upon and carried out. At the same time a pretracheal gland was removed for examination which was subsequently reported to be normal.

Following the tracheotomy the patient was immediately relieved of the respiratory distress, but the symptoms of cardiac impairment persisted. For a few hours there was an auricular fibrillation. A roentgenogram of his chest was taken and showed no evidence of cardiac enlargement. The Wassermann tests of the blood and cerebrospinal fluid were negative. Five days later improvement in the electrocardiographic tracings was noted. Ten days after operation, as the patient's vocal cords were found to have regained normal function, the tracheotomy tube was removed. Two weeks after operation his general condition had improved, and the blood pressure was 115 systolic and 75 diastolic. He was then allowed to leave the hospital, the diagnosis being generalized arteriosclerosis, acute coronary artery thrombosis with myocardial failure, in addition to the laryngeal condition.

COMMENT

Of interest in this case are the short duration of the abductor paralysis, the bilateral involvement and the uncertain etiology. The rapid recovery

suggests some transient disturbance, such as the anoxemia of cardiac failure as the probable cause.[1]

The reason for the susceptibility of the abductor nerves to "toxic" effects has been pointed out by Russel. He showed that the abductor and adductor fibres exist in the recurrent laryngeal nerve in separate bundles, the adductor being the larger. Experimentally, the abductor fibres lose their excitability sooner, and are apparently more vulnerable. He explains this phenomenon on a philogenetic basis. The abductor nerves (and the muscles) are of more recent development and belong to the group of nerves like those of the extensor muscles of the extremities. They follow, therefore, the general law of being less resistant to toxic influences than those of the flexors, the prototype of the laryngeal adductors.

It is claimed by some authorities that an isolated adductor or, especially, abductor paralysis does not occur, but that usually the entire recurrent laryngeal nerve is affected, although the paralysis of only one of the muscle groups is clinically demonstrable. The fact that the cords are not in the typical "cadaveric" position would indicate that some function remained in the antagonist muscles. For instance, the presence of an abductor palsy only, although the entire nerve is involved, may be explained by the slight adductor function remaining in the arytenoideus and lateral crico-arytenoideus muscles. The innervation for this function is derived from the communication of some of the fibres of the recurrent with some of the fibres of the external (motor) branch of the superior laryngeal, or from some filaments which cross over from the recurrent laryngeal of the other side.

It is probable that the periods of relief of respiratory distress when the patient was in the reclining position may have been due to a mechanical change in the position of the cords, such as a slight temporary separation due to their weight. Since it is likely that this patient will have further attacks of cardiac decompensation, it will be of interest to record whether or not there will be recurrence of the abductor paralysis. During the seven months since his discharge from the hospital he has had periods of mild precordial pain and oppression, readily controlled by nitroglycerine. He is annoyed considerably by headache and dizziness on slight exertion, probably due to the myocardial weakness. The vocal cords, however, remain unimpaired.

REFERENCES

New, G. B., and Childrey, J. H.: Paralysis of the Vocal Cords. Arch. Otolaryng., 16: 143, 1932.

Ortner, Cited by Langeron, L.: Rétrécissement mitral—Paralysie récurrentielle Syndrome de Claude Bernard-Horner. Bruxelles Méd., 9: 163, 1928.

Smith, A. B., Lambert, V. F., and Wallace, H. L.: Paralysis of the Recurrent Laryngeal Nerve. Edinburgh M. J., 40: 344, 1933.

[1] More and more instances are being found of unilateral (left) abductor paralysis in patients with cardiac failure. But the paralysis must be looked for, because with a unilateral cord involvement the voice is practically unimpaired.

A CONTRIBUTION TO THE QUESTION OF LOCALIZATION IN DISSEMINATED NEURODERMITIS[1]

SAMUEL M. PECK, M.D.

[*Services of Dr. B. Schick and Dr. I. Rosen*]

The question of localization of many forms of dermatoses, based mainly on anatomical grounds, has remained unanswered in many instances. Various theories have been proposed to account for some of these tendencies. It is well known that epidermophytosis of the feet very often is associated with allergic manifestations (epidermophytids) which appear only on the hands; that lichen planus, while often generalized, has a predilection for the head of the penis and the extremities; and then we have the classic example of the tendency of psoriatic lesions to appear on the extensor surfaces, especially elbows and knees.

An important problem which is at present paramount in the minds of the dermatologists is the reason for the localization of certain types of eczemas. I refer specifically to the so-called disseminated neurodermitis, as it is well known that the persistent patches, and even the only patches to be seen, have a tendency to be strictly limited to the flexors of the elbows and knees. If the modern conception of the cause of this disease is an allergic manifestation of the skin—a hypersensitivity to a food or to some emanation or contact—are we dealing with a purely local hypersensitivity or are there special factors which, in the presence of a generalized skin sensitivity, tend to localize the disease in those areas?

The following case is reported because it is believed that it throws some light on the question of localization of disseminated neurodermitis.

CASE REPORT

History (O. P. D. 2374). A boy, born at term, developed at the age of four months, while still on the breast, a rash on both cheeks. The mother was on a general diet during her pregnancy. The eruption continued for three months and then disappeared. When the boy was seven months of age, it reappeared on his back and lasted for two months. At the age of two years, and a week before he was brought to the clinic, the eruption reappeared. There was no history of children's diseases. There was no history of allergy in the family.

Examination. The general physical examination was negative except for enlarged tonsils. The skin on the left side of the back from the pelvis

[1] From the out-patient department.

upwards showed a flat hemangioma. The hemangioma was irregular in outline and extended over the left side of the body and on the thigh. Throughout this nevus, there were oval scars which were supposed to have been the sites of previous infections. In these areas, the nevus had practically disappeared.



FIG. 1. Vascular nevus with overlying disseminated neurodermitis. The light oval areas represent scars as a result of previous infections (?).

In the area of the nevus and sharply localized to these areas, the skin presented typical lichenified eczema in some and vesicles and scaling in others. In the inguinal region extending on to the pubes there were small oval scaling eczematoid patches. The skin of the legs was not effected.

Course. During the ensuing six months of observation at the clinic, the lesions on the back gradually disappeared, with an occasional papular eruption appearing on the face, neck, abdomen, and uro-genital region.

On August 14, 1933, at the age of two and a half years, he presented typical disseminated neurodermitis involving the back of the neck and the flexor area of the right arm. An area sharply limited to the nevus showed a similar skin involvement. Skin tests, both patch and scratch, were negative. There was very little response to elimination diets. Under local therapy the child slowly improved.



FIG. 2. With greater magnification the sharp localization of the eczema to the epidermis overlying the nevus is especially noticeable.
Arrow is in nevus-free area. Note absence of eczematoid changes.

The child was seen again on April 19, 1934. He now presented a typical lichenified eczema (disseminated neurodermitis) in the bends of the elbows and knees. The skin over the nevus, and sharply localized to it, was similarly involved (figs. 1 and 2). Under local therapy, the child again improved.

On his last visit, July 1934, he was practically free of his skin condition.

COMMENT

It is thought that in disseminated neurodermitis the etiologic agents reach the skin in many cases by way of the blood stream and react with the fixed antibodies in the epidermis, perhaps in the papillary bodies to elicit the clinical manifestations. For some unknown reason, either the allergens or the antibodies or both tend to become concentrated in certain areas of the skin, thus determining the localization. In the presence of a general skin hypersensitivity, especially in those cases where positive skin tests, intradermal or patch, have been elicited, no increased sensitivity except in isolated cases has been demonstrated at the site of the eruption. There remains the possibility that because of an increased vascularity the flexoral areas receive a greater amount of allergens than any other part of an equally hypersensitive skin.

In 1913 v. Pirquet proposed such an explanation for the localization of the eruption in measles. He apparently demonstrated the relationship between the arterial supply and the intensity of the skin eruption in any given part of the body. It seems to me that in the case which is here reported, the increased vascularity of certain sections of the skin of the back, because of an underlying nevus, seems to play a definite rôle in the localization of the disseminated neurodermitis.

MILIARY ABSCESSES OF THE KIDNEY

An Obscure Clinical Picture

ALEXANDER H. ROSENTHAL, M.D.

[*Service of Dr. Edwin Beer*]

The case here described illustrates the difficulty of recognizing suppuration of the renal parenchyma and the diagnostic value of intravenous urography. The clinical picture in this instance was characterized by febrile episodes which were at first obscure in origin but were later accompanied by symptoms of left kidney infection and vesical irritability. The final diagnosis was reached only after continued observation of the patient.

CASE REPORT

History (H. N. 350145). A white, unmarried man, 39 years old, a printer by occupation, was admitted to the medical service of the hospital on January 12, 1933, complaining of fever, chilly sensations, malaise, a slight cough productive of mucoid expectoration, loss of weight, and frequency of urination. The symptoms were of two weeks duration and suggested an upper respiratory infection. His past history included an appendectomy at fifteen years of age and arrested pulmonary tuberculosis at the age of sixteen.

Examination. The patient appeared acutely ill, and his temperature was 103.8°F. The only significant physical finding was inflamed tonsillar follicles. Lumbar tenderness could not be elicited. Agglutination and other laboratory tests were negative. The leucocyte count was 22,900 per centimeter with 79 per cent of polymorphonuclear neutrophils. The urine contained a slight amount of albumin, many isolated pus cells, and on culture yielded B. coli.

Course. In the course of the five days following admission to the hospital, the temperature fell to normal, and there was a progressive decrease in the other symptoms. He was discharged eight days after admission, apparently well, with the diagnosis of an acute upper respiratory infection. Several days after leaving the hospital he again began to cough and at this time also developed marked frequency of urination. On the fifth day he experienced sharp non-radiating attacks of pain in the left lumbar region. The attacks continued for two days and were accompanied by profuse perspiration and dysuria.

Second admission. He was readmitted to the medical service on Janu-

ary 28, 1933. On examination the temperature was 100.4°F., and there was tenderness in the left hypochondrium. Cystoscopy showed a diffusely inflamed bladder with mucous adherent to its wall. The urine from the left kidney contained several small clumps of pus cells but no tubercle bacilli. A flat plate of the abdomen was negative for urinary calculi. The diagnosis was now thought to be a left pyelonephritis. On February



FIG. 1. Roentgenogram showing the size of the left kidney on February 11, 1933

12, 1933 the patient's temperature suddenly rose to 104.4°F. and was accompanied by sharp pain in the left lumbar region radiating to the penis. The leucocyte count at this time was 23,800 per centimeter with 91 per cent of polymorphonuclear neutrophils. There was slight left lumbar tenderness.

The acute episode subsided within a few days, following which a second

cystoscopy was performed with results similar to those obtained on first examination, i.e., several small clumps of pus in the urine from the left ureter. A left retrograde pyelogram and an intravenous urogram showed no abnormalities in the left kidney. The patient again improved spontaneously and was discharged ten weeks after this admission. Eleven



FIG. 2. Roentgenogram taken March 22, 1933 showing increase in size of the left kidney and the irregularity of its contour.

days later another attack of severe pain in the left loin radiating to the penis accompanied by chilliness and sweating brought the patient back to the hospital.

Third admission (March 20, 1933). The temperature was 104.4°F., and now there was marked tenderness in the left loin. An intravenous urogram revealed a definite and striking difference in the appearance of the

left kidney (fig. 1). Whereas the organ was previously reported as negative by the radiologist, it was now reported as resembling a polycystic kidney. It was definitely increased in size and irregular in contour. While the size and shape of the pelvis was practically unchanged, the parenchyma was considerably thickened. Obviously, changes in the renal parenchyma itself had produced this increase in size. The diagnosis of suppuration of the left kidney was made.

The left kidney was exposed and found to be riddled with innumerable abscesses. A nephrectomy was done, and the wound was packed with a Mikulicz tampon. A silk ligature was applied to the vascular pedicle, and the ureter was tied with chromic catgut. The pelvis and ureter were found to be moderately thickened and granular. Although B. coli was cultured from the abscesses, it was felt that the staphylococcus was probably the main agent since a tonsillar infection preceded the kidney disease, and both the clinical and pathological pictures were more characteristic of a coccus rather than a bacillary infection. The post-operative course of the patient was uneventful except for a short period of pain over the right abdomen. The patient was seen in the Follow-up Clinic three months after operation and was apparently well.

COMMENT BY DR. EDWIN BEER

This unusual case of probably a combined coccal and bacillary infection illustrates the difficulty often encountered in diagnosis. At first it seemed to be an ordinary case of B. coli pyelonephritis with relapses. Later the increase in the size of the involved kidney and, more especially, the widening of the parenchymal or cortex shadow in the excretory urogram made it evident that there must be extensive disease of a suppurative character in this area. This observation was unique since the diagnosis based on such observations is most unusual in the large series of cortical abscesses treated on the surgical service.

REFERENCES

Brewer, G. S.: The Present State of our Knowledge of Acute Renal Infection. J. A. M. A., 57: 179, 1911.

Hyman, A.: Concerning Metastatic Renal Abscesses. Urolog. and Cutan. Rev., 24: 623, 1920.

Mathe, C. P.: Cortical Abscesses of the Kidney. J. A. M. A., 93: 1862, 1929.

Von Lichtenberg, A.: In a record of the discussion appended to an article by E. Starr Judd and C. Baxter Brown: Cortical Abscess of the Kidney. Surg. Clin. N. Am., 9: 801, August 1929.

TRAUMATIC ANEURYSM OF THE ABDOMINAL AORTA[1]

SAMUEL H. AVERBUCK, M.D.

[*Service of Dr. George Baehr*]

Aneurysm of the abdominal aorta is comparatively rare. The usual cause of such an aneurysm is syphilis, and, less commonly, arteriosclerosis. A patient with a large aneurysm of the abdominal aorta was recently observed. He gave a history of an abdominal injury sustained in youth. This, when added to information suggesting that the aneurysm was detected by physicians twenty-five years previously, supported the opinion that the aneurysm was traumatic in origin. This diagnosis was further strengthened by the absence of any evidence of syphilis. The case is recorded because of the unusual occurrence of a traumatic aneurysm of the abdominal aorta of such long duration.

CASE REPORT

History (H. N. 360818). The patient was a married man, age 57, said to have been in excellent health until his recent illness. As a boy he was struck forcibly in the abdomen, with no immediate sequellae. While serving in the German army he was told by the examining physician that "his heart was in the abdomen." One year prior to admission to the hospital he had a protracted attack of constipation which was accompanied by left upper quadrant and periumbilical pain. This lasted five days and left no residual symptoms. He first presented himself at the outpatient department with the complaint that ten days prior to his visit to the clinic he experienced two periods of obstinate constipation, each lasting three days. The condition was relieved only by repeated drastic cathartics. Hewas referred to the hospital for further study.

Examination. He was a well preserved man, complaining of mild abdominal pain. The pupils were somewhat irregular, but reacted promptly to light and in accommodation. The heart and lungs were normal. The liver and spleen were palpable. In the epigastrium, somewhat to the left, there was felt a grape-fruit size pulsating mass. It was not tender and it moved with respiration. The pulsation was expansile. All the peripheral pulses were present. The blood pressure was 134 systolic and 78 diastolic. The urine was normal. The blood Wassermann reaction was negative.

[1] Presented before the Clinical Pathological Conference of Mt. Sinai Hospital, January 10, 1934.

The report of the X-ray examination of the abdomen read as follows: "There is a large pyriform shadow in the upper abdomen which overlies the lower dorsal and the upper two lumbar vertebrae. It is approximately 13.5 centimeters in diameter. The margins of this shadow are calcified



FIG. 1. The clot filled aneurysm arising from the abdominal aorta (shown in section). The arteriosclerosis is minimal below the tumor.

and, in the lateral view, the posterior wall is seen to hug the spine and to be parallel to it. The appearance is that of calcification in an aneurysm."

Pneumoperitoneum demonstrated marked calcification of the thoracic and abdominal aorta.

Course. The intestinal symptoms of the patient were thought to have

been the result of pressure on the colon by the aneurysm. In the course of observation the symptoms disappeared and the patient was allowed to return home. One month later he began to have generalized abdominal pain radiating to both shoulders. Weakness developed rapidly and then a marked pallor appeared. When readmitted to the hospital he was in shock with a blood pressure of only 90 systolic and 60 diastolic. The pulse was rapid and small. The aneurysmal mass in the abdomen could be felt as on the previous admission. There was moderate abdominal distension, but no shifting dullness. The posterior rectal pouch bulged and was tender. The hemoglobin was 65 per cent. Morphine was liberally administered. Nevertheless, the condition of the patient declined rapidly and death ensued on the following day. The clinical impression was that the aneurysm had bled into the peritoneal cavity through a small perforation.

Necropsy findings. A large amount of liquid and coagulated blood was found in the peritoneal cavity. In the epigastrium there was found a large, firm, spherical mass 15 cm. in diameter. This tumor arose from the anterior portion of the abdominal aorta, springing from the portion between the thoracic aorta and the site of origin of the renal arteries. Posteriorly the tumor was adherent to the first, second and third lumbar vertebrae. The body of the second vertebra was eroded. A small perforation was found in the center of an area of softening on the anterior surface of the tumor. Section disclosed a communication between the tumor and the lumen of the aorta. The aneurysm was partially filled with lamellae of fibrinous and hyaline material (Fig. 1).

There was severe atherosclerosis of the aorta with areas of calcification and ulceration. This advanced process did not extend below the level of the renal arteries. Only slight changes were present in the common iliac arteries and their branches.

The spleen was enlarged to twice the usual size. The splenic vein contained a moderately friable, grayish-red thrombotic cord which obstructed the vein and extended into the hilus of the spleen.

Microscopic examination disclosed no evidence of syphilis in the aorta.

COMMENT

The early symptoms of the patient were referable to the gastro-intestinal tract with periods of constipation and abdominal pain. Yet, upon examination it became obvious that an aneurysm of the abdominal aorta existed and that no distinct gastro-intestinal abnormality was present. This emphasizes the fact that aneurysms of the abdominal aorta per se rarely give rise to symptoms except in the end stages when perforation and rupture occur. The clinical manifestations when present are most commonly due to pressure on neighboring organs. Ureteral obstruction with hydronephrosis, vertebral erosion with root pains or paraplegia, intestinal

or gastric obstruction, portal, splenic or mesenteric vein thrombosis are some of the conditions which may give the first indications of the presence of an abdominal aneurysm. Search for such a lesion will reveal the characteristic and pathognomonic finding—a pulsating expansile tumor. It must, however, be differentiated from a dynamic aorta or a visceral tumor transmitting an aortic pulsation. A pulsating aorta does not present a well defined tumor as in the case of aneurysm. A visceral tumor will fall forward and no longer transmit the aortic thrust when the patient is in the knee-chest position. When an aneurysm is completely filled with clotted blood it may simulate any intra-abdominal solid mass and X-ray examination will aid in the diagnosis.

The etiology of the aneurysm in this case was not entirely clear. Syphilis, which is the cause of most aortic aneurysms, was excluded by history, clinical, and serological findings. A congenital basis for the vascular tumor was suggested. But in such instances, too, lues is usually present and subjects with congenital aneurysm rarely live to the advanced years enjoyed by our patient. Furthermore the abdominal aorta is an uncommon site for congenital aneurysms. They usually involve smaller vessels.

The entire thoracic aorta and a large part of the abdominal aorta was markedly sclerotic and calcified. Therefore, arteriosclerosis was considered as the possible underlying cause. Moreover, arteriosclerotic aneurysms of the abdominal aorta are more frequent than similar aneurysms of the thoracic aorta. However, it is highly significant that an army physician, twenty-five years before had found in the patient what he termed "an abdominal heart." Presumably the aneurysm had been present at that time. It is most unlikely that there could have been such a marked degree of arteriosclerosis at the age of 30 as to have caused this condition. The history of trauma to the abdomen appears particularly significant. Injury to the aorta with resulting intra-mural hemorrhage and fibrosis could result in a site of lowered resistance in the aortic wall. The latter, yielding to the relatively high intra-aortic pressure, may have resulted in the aneurysm. The fact that the arteriosclerosis was restricted to the portion of the aorta proximal to the tumor strongly supports the traumatic explanation of the aneurysm and excludes general arteriosclerosis as its cause.

Hemorrhage is the most common, and, usually, a fatal complication of aortic aneurysm. Perforation into adjacent organs may cause melena, hemoptysis or hematemesis. Explosive rupture with extensive hemorrhage into the peritoneal cavity often results in sudden death, or, as in the case under discussion, slow bleeding through a pin point perforation causes a more gradual fatal issue.

REFERENCES

Osler, W.: Aneurysm of the Abdominal Aorta. Lancet, 2: 1089, 1905.

Busch, S.: Ueber traumatisches Aortenaneurysma. Zentralbl. f. Herzkrkh., 23: 114, 1921.

Busse, E.: Ueber Zerreissungen und traumatische Aneurysmen der Aorta. Virch. Arch., 183, H. 3: 440, 1906.

UNUSUALLY CLEAR EVIDENCE OF ASPIRATION AS THE CAUSE OF PUTRID LUNG ABSCESS

LEO STERN, D.D.S.

[*Surgical Service of Dr. Harold Neuhof*]

Operation for extra-oral drainage of a putrid submaxillary abscess under inhalation anaesthesia was complicated by spontaneous rupture of the abscess intra-orally. Cyanosis and generalized convulsive movements appeared during the general anaesthesia and were interpreted as indicating aspiration of pus. Thoracic pain developed on the sixth postoperative day and was followed by classic symptoms of lung abscess. Uneventful recovery followed operation for the abscess of the lung.

CASE REPORT

History (H. N. 345425). A white male of 29 years was admitted on September 11, 1933, complaining of pain and swelling in the left mandibular region. There was a large, tense, fluctuating swelling at the angle of the mandible and the adjacent submaxillary region. A diagnosis of suppurative submaxillary lymphadenitis due to an acute alveolar abscess of the mandibular third molar was made.

An external incision under nitrous-oxide-oxygen anaesthesia was planned for the evacuation of the abscess. Shortly after induction of anaesthesia the patient became highly excited and developed moderate generalized twitchings. Simultaneously the odor of foul pus was noted. Purulent fluid was discovered oozing from the mouth, the inhaler containing a quantity of the material. The source of the pus was a spontaneously ruptured intra-oral abscess situated lingually to the third molar. The opening was enlarged for better drainage.

The patient became quite cyanotic and suffered severe, generalized convulsive movements. Notwithstanding discontinuance of the anaesthesia, the cyanosis deepened; breathing became labored; the eyes rolled upwards and the pupils became dilated. The pulse became rapid and of poor quality, and all reflexes were depressed. Slow but progressive recovery ensued.

The patient was discharged six days after operation.

On the day before his discharge, that is, on the sixth post-operative day he experienced marked pain in the right suprascapular region, but did not mention this symptom. The pain, which was subsequently aggravated by breathing, continued for three days. Ten days later a productive cough developed, the expectoration soon becoming foul. Foul breath and spu-

tum persisted, accompanied by malaise and a loss of thirteen pounds in weight.

He was readmitted to the hospital on November 7, 1933. Physical examination disclosed impaired resonance and a few râles over the right apical region, both anteriorly and posteriorly. Roentgenogram showed an abscess in the axillary portion of the upper right lobe. Operation which consisted of thoracotomy, pneumontomy and wide drainage of the abscess resulted in recovery.

COMMENT

It is interesting to note the location of the lung abscess in its relationship to the right-sided prone posture of the patient during the episode in which aspiration is presumed to have occurred. The opportunity for close observation of the evolution of lung abscess was unusual in this case. The sequence of symptoms, particularly with reference to their chronology, conform with the views on pathogenesis and etiology which are held by the chest group at the Mount Sinai Hospital.

Because of the degree of trismus attending infections of the jaw of this description, the intra-oral and especially the lingual pointing of abscesses is easily overlooked. Relaxation of muscle spasm when general anaesthesia is induced affords the opportunity for a check-up. The advantage of routinely using the mouth-prop, pharyngeal packing and suction tube in operation on abscesses of this type is suggested by their liability to rupture within the mouth. Accidents of this character have been observed by the writer in several similar cases.

REFERENCE

Neuhof, H. and Wessler, H.: Putrid Lung Abscess—Its Etiology, Pathology, Clinical Manifestations, Diagnosis and Treatment. J. Thor. Surg., 1: 637, 1932.

Special Articles

PULMONARY EMBOLECTOMY[1]

The Need of Organization for Prompt Surgical Intervention

HOWARD LILIENTHAL, M.D.

Six per cent of all deaths following surgical operations are caused by pulmonary embolism. My authority for the above statement is a paper by Mahorner and Ochsner (1), as well as a letter from Dr. Alton Ochsner giving references to the literature with calculations based on an ample number of cases (more than ninety thousand) (2 3). He also saves me a bit of literary investigation by telling me that not a single successful pulmonary embolectomy has been performed and recorded in the United States.

Long before these striking statistics were brought to my notice, I had resolved to do whatever was in my power to arouse interest in this subject so that we might no longer fail to do our best in this terrible accident provided the patient is in good general condition. Refusal to act merely because the lesion happens to involve a structure rarely the site of operative procedure[2] is unworthy of the profession of surgery.

In 1930 an important paper was read by Gunnar Nystrom (4) of Uppsala, Sweden on pulmonary embolectomy (Trendelenburg's operation). Up to that time fourteen patients had survived operation, of whom seven were "discharged healed" (50 per cent). Thirty operations, more or less, had been published and probably many more had not been reported. In the discussion (loc. cit.) I stated that, even though in America we do not all have permanent first assistants residing in our hospitals, there is no reason why intensive training in this particular operation, as well as in the diagnosis of embolism, should not be given to a properly qualified House Surgeon who should be given authority to act in emergency. The head nurse should also be taught to recognize the symptoms of pulmonary thrombosis so that she may at once give the alarm and have the patient transferred to the operating room. It must be remembered that patients apparently dead have been resuscitated and have fully recovered after the extraction of emboli from the pulmonary artery.

Elliott C. Cutler (5) states that his resident surgeons up to 1934 had operated in four cases. The operations were not successful, and Cutler believes that they were all done too late. Cutler's conclusions are prac-

[1] Read before the Mount Sinai Hospital Surgical Conference, October 15, 1934.

[2] See also Lilienthal, Thoracic Surgery. Phila., Saunders, 1: 510, 1925.

tically the same as those represented by my own remarks three years earlier. The entire matter is one of preparedness. Cutler agrees with me that the resident staff of our hospitals should be authorized to attack the problem in the individual case, though he qualifies his words by saying that "any good young surgeon who has had *five or six years*[3] of competent training" should be able to perform the operation.

Dr. J. C. White in the discussion of Cutler's paper differs somewhat, saying that the procedure is not so simple as represented and that the diagnosis is not always easily made. While I admit that the recognition of the accident may not be possible in 100 per cent of the cases, yet the errors disclosed at operation have been extremely rare—much more infrequent than those found at operation in other emergencies.

Averbuck (6) recently pointed out the possibilities of error in differentiating acute coronary thrombosis from pulmonary embolism, and others have stressed the matter of diagnostic accuracy. Yet, following along clinical lines, it must be conceded that when life is threatened by any other acute surgical complication *and the patient is otherwise a good risk*, few surgeons will hesitate to act even though there be only one chance in many to save life.

Thoracic surgeons with whom I have spoken agree in principle that the only hope in massive pulmonary embolism is by direct attack, not only in cases in which previous operation has been performed, but also in medical diseases and in obstetrics.

Literature dealing with the technique is still scanty, but American surgeons are discussing the matter more and more freely, and results are sure to follow. Griswold (7) presented two unsuccessful cases, one of which might have resulted in recovery but for delay. Meyer (8) in 1926 devised a simplified approach directly through the pericardium[4] and was fortunate enough to save three patients.

But this is all beside the mark. My earnest wish is that there should be no delay in mapping out a plan for this great clinical and scientific advance. The medical, surgical, and intern staffs of the hospital and the head nurses should be molded into a carefully worked out organization, and should, to use a modern expression, become "embolectomy minded." But whatever the plan, it is urgent that down to the last detail, things should be ready for the treatment of this emergency. The first successful case in this country will mean much to American surgery and, incidentally, to the hospital which has had the foresight to be ready for effective action.

REFERENCES

(1) Mahorner, R. H., and Ochsner, A.: Use of Leeches in Treatment of Phlebitis and Prevention of Pulmonary Embolism. Ann. Surg., 98: 408, 1933.

[3] Italics mine.

[4] Trendelenburg's original operation also entered the pericardium but not directly.

(2) Sulger, E., and Boszin, T.: Ueber die post-operative Thrombose und Embolie, sowie ihre therapeutische und prophylaktische Behandlung mit Blutegeln. Deutsch. Ztschr. f. Chir., 216: 175, 1929.
(3) Henderson, E. F.: Fatal Pulmonary Embolism; a Statistical Review. Arch. Surg., 15: 231, 1927.
(4) Nystrom, G.: Experiences with the Trendelenburg Operation for Pulmonary Embolism. Tr. Am. Surg. Soc., 48: 18, 1930.
(5) Cutler, E. C.: Pulmonary Embolectomy. New England J. Med., 209: 1265, 1933.
(6) Averbuck, S. H.: Differentiation of Acute Coronary Artery Thrombosis from Pulmonary Embolization. Am. J. Med. Sc., 187: 391, 1934.
(7) Griswold, R. A.: Trendelenburg Operation for Pulmonary Embolism. Ann. Surg., 98: 33, 1933.
(8) Meyer, A. W.: Operative Treatment of Embolism of Lungs. Surg. Gynec. & Obst., 50: 891, 1930.

SOME OBSERVATIONS ON THE NITROPHENOLS

Experimental and Clinical[1]

E. C. DODDS, M.V.O., D.Sc., Ph.D., M.D., B.S., F.R.C.P.

[*From the Courtauld Institute of Biochemistry, Middlesex Hospital, London*]

In this brief talk on the subject of nitrophenols it will be impossible to give an adequate summary of the literature, and consequently it is proposed to refer solely to the more outstanding publications on the subject. A careful review seems to indicate that the earliest publication about the action of nitrophenols was in the year 1885 when Cazeneuve and Lépine (1) noticed that this group of compounds had a marked effect on the metabolism of animals. Little seems to have been done until some 40 years later when experiments were conducted in the laboratory of Professor Heymans in Ghent (2) and by Professor Plantefol in Paris (3). These two independent groups of workers were able to show that 2:4-dinitrophenol when administered to animals caused a rapid increase in the oxygen consumption, and that if the administration were pushed, hyperthermia developed; if the administration of the drug were continued at this high level, death from hyperpyrexia supervened. A most careful series of experiments was performed and the dosage necessary to raise the metabolic rate of the most common types of laboratory animals and pigeons was accurately worked out. By the year 1930 an extensive amount of information had been collected on the activity of these compounds, but as to the actual mechanism of the action, no adequate theory had as yet been advanced.

To Tainter (4) and his group of workers belongs the credit of applying these results to the treatment of human beings. Tainter was impressed by the fact that the animals to whom large quantities of the material had been given died of hyperthermia and not of the toxic action of the compound on the liver as most toxicologists would have imagined. This being so, Tainter conducted a series of experiments with a view to determining whether quantities of material could be administered to human beings which would raise the metabolic rate but would not produce toxic symptoms. Reference to the series of publications made by this important group of workers will give a full account of their experiments (4). Here it may be stated that they found that the administration of a dose of 2:4-dinitrophenol equivalent to some 3 mg. per kilogram bodyweight would

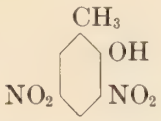
[1] Lecture given at the Mount Sinai Hospital, New York City, on May 23, 1934.

cause an increase in the basal metabolic rate up to about +40 per cent, and that most persons under these circumstances would lose weight. It is perhaps a little unfortunate that the earlier papers of Tainter and his school did not emphasize the fact that the diet must be taken into consideration. A reader of these earlier papers would tend to get the impression that dietetic restrictions were not necessary, although a little thought would indicate that such could not have been the meaning. For example, if it be supposed that a patient's total requirements per 24 hours be some 3,000 calories with a basal rate of 1,500 calories, the administration of dinitrophenol will increase his calorie output by some 700 or 800 calories per 24 hours. Now if such a person be consuming only 3,000 calories of food per 24 hours, then under dinitrophenol treatment he would lose weight. On the other hand, suppose the patient be a gross over-eater who may be taking 5,000, 6,000 or even 7,000 calories per 24 hours, then dinitrophenol will have no effect upon his weight since an increase of 50 per cent in his basal metabolic rate will be swallowed up in the excess of intake over output. These points have been very clearly emphasized in later papers from the San Francisco school.

The great value of this work lies in the fact that patients can be made to lose weight on diets which are so satisfying that even the weaker willed will not be tempted to break away from the régime.

The toxic effects of dinitrophenol are in the main associated with the raising of the metabolic rate as pointed out by the San Francisco group of workers, and no untoward symptoms are experienced unless the rate be increased above 50 per cent. A train of events is then established consisting of sweating, headache, apathy, and feeling of malaise, which may pass on to complete unconsciousness and finally death from hyperpyrexia as has occurred when excessive doses have been taken. Various manifestations are also experienced which may be attributed to an allergic effect of the drug; these consist of skin rashes and occasionally deviations and modifications of the sense of taste. One of the most striking characteristics of the action of dinitrophenol is that the metabolic stimulation bears no relationship to the cardiovascular system. Thus it is possible to have a patient whose metabolic rate is raised to +80 per cent with practically no corresponding increase in the pulse rate, blood pressure, etc. This is a very important point since it indicates that any attempt to assess the basal metabolic rate by the type of method which employs Read's formula is out of the question.

For some years past a considerable amount of work has been done in my laboratory on the action of poly-nitrophenols. A search was made for a compound more potent than 2:4-dinitrophenol and together with Sir William Pope (5) it was possible to show that 4:6-dinitro-*o*-cresol was, weight for weight, considerably more potent than 2:4-dinitrophenol. The method for studying the pharmacological activity of this group of



compounds consisted in observing the oxygen consumption of guinea-pigs by means of a modified Krogh technique. In this manner we were able to show that under the same conditions 4:6-dinitro-*o*-cresol was about four times as active as 2:4-dinitrophenol. This fact has subsequently been confirmed by other workers.

Turning to the question of toxicity, it would appear that this is in the same neighborhood as that of 2:4-dinitrophenol, but the great difficulty of assessing the toxicity of compounds of this type cannot be over-emphasized. As already pointed out, this group of compounds exerts the lethal effect through stimulating the metabolic rate to such an extent that hyperthermia and death will ensue. In our experience it has been impossible to demonstrate any toxic changes in the liver, since the animal will die of hyperpyrexia long before the compound is capable of producing any toxic effects. The administration of small quantities of 2:4-dinitrophenol to animals over prolonged periods has failed to reveal any toxic effect upon the liver or kidneys (Tainter (6)). Similar experiments have been carried out by ourselves with 4:6-dinitro-*o*-cresol. It can therefore be stated that in therapeutic doses—namely, 3 mg. per kilogram body weight of dinitrophenol—these compounds would appear to be non-toxic.

A very careful series of experiments was conducted upon normal volunteers in order to find out whether dinitro-*o*-cresol was suitable for administration to human beings. After a long and elaborate investigation it was shown that doses of 0.5 to 1 mg. per kilogram body weight was sufficient to increase the basal metabolic rate to within the region of +50 per cent. This is from one-third to one-sixth the quantity of dinitrophenol, and in no circumstances should dinitro-*o*-cresol be used in the same doses as dinitrophenol since, if this be done, a fatal result may well be expected.

The substance was administered to a number of obese persons with entirely satisfactory results provided that general dietetic principles were observed. In our experience up to the present, no rash or allergic response to this compound has been observed. It would thus appear to us to be a substance of considerable therapeutic value, but it cannot be too strongly emphasized that the most careful control must be kept upon the patient. The basal metabolic rate should be performed frequently and a constant watch kept over the patient. It has been our custom to see the patient every day —at least for the first week—in order to make quite sure that the dosage was not too much. In the event of an over-dose, the measures recommended by Tainter should be adopted. These consist of steps to reduce the temperature by cold sponges, etc., the administration of oxygen, and in our experience a purge to assist in hurrying any remaining unabsorbed material through the alimentary tract.

It can be seen, therefore, that the material is of great interest to the physician and practical therapeutist; from the theoretical and research point of view it is even more interesting.

It was thought that the effect of dinitro-*o*-cresol on the question of myxoedema was worthy of investigation. A patient with well established myxoedema was selected, and thyroid administration was stopped until all the signs and symptoms of the disease were apparent. The basal metabolic rate at this point had sunk to some −18 per cent. Dinitro-*o*-cresol was then administered, and it was found possible to elicit the same response in a myxoedematous person as had occurred in the normal. In one case the basal metabolic rate was raised to +80 per cent. Having established the fact that a myxoedematous patient would respond in the same manner, measures were adopted to fix the basal metabolic rate at a constant level of about 20 or 30 above normal. In these conditions, the signs and symptoms of myxoedema remained in evidence, and although the metabolic rate was raised, the myxoedema remained unaffected. This fact is clearly demonstrated by photographs published in the Lancet (7).

From this it can be concluded that the action of thyroxine is much more subtle than the mere raising of the metabolic rate, and taken together with the lack of action of dinitro-*o*-cresol upon the circulation, it can be seen that this type of compound cannot be used as a substitute for thyroxine.

It is well known that thyroxine has no action upon the tissue slice *in vitro*. A number of careful experiments have been made in my laboratory and also by other workers, and it has been impossible to demonstrate any effect of thyroxine upon the surviving tissue slice when studied by the methods of Warburg. The same however does not apply to 4:6-dinitro-*o*-cresol. Together with Greville (8) it has been possible to show that the addition of dinitro-*o*-cresol caused a very great increase in the oxygen consumption of kidney slices suspended in lactate-containing phosphate media. The respiration is maintained at an increased value (80 per cent increase) for at least an hour after the addition of the nitrophenol, the Q_{O_2} rising to so high a level as 60. The respiration was also increased in a pyruvate-containing medium, and the respiratory quotient was found to be the theoretical one for the oxidation of pyruvate. The optimum concentration was found to be 10^{-5}M; with higher concentrations the respiration was inhibited.

It is well known that the respiration of tumor tissue is defective. This was shown in my laboratory by a series of investigations carried out by Dickens and Simer (9). It is also well known that the respiration may be stimulated by the addition of certain dyes such as methylene blue and pyocyanine. It was felt that the investigation of the action of 4:6-dinitro-*o*-cresol on the metabolism of malignant tissue would prove to be of interest. Greville and I (10) were able to show the rather astonishing phe-

nomena of simultaneously increasing both the respiration and glycolysis of tumor tissue. In so far as we know this compound is the only one that will produce an increase in both these two processes.

The significance of these various observations is at present beyond assessment. It has only been possible to touch very briefly upon the more general reactions of this interesting group of substances. There are, of course, many other interesting phenomena such as the effect of these bodies on yeast which has been studied by Field of Leland Stanford. In conclusion, one can state very definitely that an extremely interesting group of compounds has been brought to light and that, quite apart from the purely clinical application of these compounds, an investigation of their mechanism of action will undoubtedly throw light upon many physiological processes.

REFERENCES

(1) Cazeneuve, P., and Lépine, R.: Physiologie Experimentale: Sur les Effets produits par l'Ingestion et l'Infusion intra-veineuse de trois Colorants jaunes, dérivés de la Huile. Comt. Rend. Acad. des Sci., 101: 1167, 1885.

(2) Heymans, C., and Bouckaert, J. J.: Action hyperthermisante et Cardio-Vasculaire du Nitro-Alphanaphtol chez le chien. Arch. internat. de pharm. de Thérap., 35: 63, 1929.

(3) Plantefol, L. et al.: Études sur l'Action pharmacologique du Dinitrophénol 1-2-4 et des Phénols Nitres. Ed. 1, Paris; Boin, 1932.

(4) Cutting, W. C., and Tainter, M. L.: Actions of Dinitrophenol. Proc. Soc. Exper. Biol. & Med., 29: 1268, 1932.

Tainter, M. L., and Cutting, W. C.: Febrile, Respiratory and some other Actions of Dinitrophenol. Pharmacol. & Exper. Therap., 48: 410, 1933.

Cutting, W. C., Mehrtens, H. G., and Tainter, M. L.: Actions and Uses of Dinitrophenol; Promising Metabolic Applications. J. A. M. A., 101: 193, 1933.

(5) Dodds, E. C., and Pope, W. J.: Dinitro-*o*-cresol as Stimulator of Metabolism. Lancet, 2: 352, 1933.

(6) Schulte, T. L., and Tainter, M. L.: Chronic Toxicity of Dinitrophenol: Renal Function. Proc. Soc. Exper. Biol. & Med., 31: 1163, 1934.

(7) Dodds, E. C., and Robertson, J. D.: Clinical Application of Dinitro-*o*-cresol; Study of Myxoedema. Lancet, 2: 1197, 1933.

(8) Dodds, E. C., and Greville, G. D.: Acceleration of Tissue Respiration by a Nitrophenol. Nature, 132: 966, 1933.

(9) Dickens, F., and Simer, F.: Metabolism of Normal and Tumor Tissue; Respiratory Quotient, and Relationship of Respiration to Glycolysis. Biochem. J., 24: 1301, 1930.

(10) Dodds, E. C., and Greville, G. D.: The Effect of Dinitrophenol on Tumor Metabolism. Lancet, 1: 398, 1934.

ABSTRACTS[1]

The lipoids of spleen and liver in various types of lipoidosis. Harry Sobotka, David Glick, Miriam Reiner and Lester Tuchman. Biochem. J. 27: 2031, November 1933.

The lipoids and livers in three cases of Gaucher's disease were analysed and compared with the findings in two cases of Niemann-Pick's disease and with normals. The classification of these diseases according to the chemical nature of the lipoids deposited is discussed. The various shifts in lipoid distribution, which are characteristic for these diseases are explained by a derangement of enzymatic lipolysis, presumably by a deficiency of lipolytic enzymes. Deficiency of liver esterase in these and similar cases is actually demonstrated.

Diffusion of various sugars into the yeast cell. Harry Sobotka and Majorie Holzman. Proc. Biochem. Soc., J. Soc. Chem. Ind. 52: 1055, December 1933.

Observations on the influence of non-fermentable sugars on the fermentation of fermentable hexoses induced the authors to study the diffusion on various sugars into the yeast cell. Striking differences in the speed of diffusion between glucose, galactose, maltose, lactose, pentoses, and other sugars were observed. The results illustrate the highly developed specificity of biological membranes for the delicate differences between isomeric carbohydrates. Similarly delicate discriminating ability is found in the intestinal mucosa and the renal glomeruli of higher animals.

Cerebral Localization in Cerebrovascular Disease. Charles Davison, S. Philip Goodhart, William Needles. Arch. Neurol. & Psychiat. 30: 749, October, 1933.

On the basis of forty-eight carefully selected cases of cerebrovascular disease, in which the brain was available for study, the authors have attempted a correlation of clinical and pathological findings. The syndrome of occlusion of each of the main cerebral arteries is outlined and the area affected in each case described. The authors, while realizing that anatomic studies alone will not supply the answers to all the problems of cerebral localization, nevertheless consider it an indispensable method of procedure.

[1] Authors' abstracts of papers published elsewhere by members of the Mount Sinai Hospital staff.

VOLUME 1 MARCH-APRIL, 1935 NUMBER 6

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

A CASE OF EXCISION OF THE COMMON, EXTERNAL, AND INTERNAL ILIAC VEINS FOR SUPPURATIVE THROMBOPHLEBITIS, WITHOUT THE DEVELOPMENT OF POST-OPERATIVE EDEMA

HAROLD NEUHOF, M.D.

There is a twofold purpose in presenting this case, first to describe an interesting sequence of events in relation to an unusual operation, secondly to note certain features of clinical significance established by the operative procedure. The discussion of the case report will be concerned particularly with a time-honored assumption that occlusion of a main venous trunk is a cause of edema of an extremity.

A male patient, 17 years old, Hospital No. 350945, entered on April 13th, 1933. An hour before admission he sustained a bullet wound in the right hip from which considerable blood escaped. The entry wound was midway between the right iliac crest and the great trochanter. That the bullet was lodged in the ilium appeared probable from a study of the roentgen films. At operation for the control of hemorrhage, performed shortly after admission, the track of the missile was split open. The bullet was embedded in the ilium, from which it was removed after some of the overlying bone was rongeured away. The wound was packed. Excepting a single elevation of temperature to 103°F. the clinical course was uneventful for the first week after operation. Persisting fever began on the eighth day. Fever ranged irregularly between 100° and 105.2°F. for the next ten days, but presented no distinctive features. The pulse rate was proportionately accelerated. There were no chills or chilly sensations. The general condition of the patient remained fairly good but pronounced pallor developed. Repeated examinations in a search for the source of fever were essentially negative. The only possible lead was some spasm in the region of the right hip joint, elicited upon several occasions. The condition of the operative wound was thoroughly investigated and found to be satisfactory.

A thrombophlebitis was assumed to be the most likely lesion to account for the somewhat septic course without any discernible local or distant factor to explain the unsatisfactory state. On the tenth day of the febrile

period an exploratory operation for phlebitis was decided upon but operation was deferred for a day until the result of a blood culture could be obtained. There was reported the presence of hemolytic streptococci in two of the four flasks (glucose and saline), but none in the plates. This suggested that a light and perhaps transient bacterial invasion of the blood stream was present at the time of the blood culture. Operation was therefore decided upon on clinical rather than on bacteriological grounds. It seemed logical to assume that a phlebitis derived from the region of the wound and extending within the pelvis to the internal iliac vein was the possible or probable lesion. Accordingly an extraperitoneal operative exposure of the iliac veins was planned.

Operation May 3rd, 1933. An incision was made parallel to and above Poupart's ligament and was deepened through the musculature to the peritoneum. The latter was stripped mesially over the psoas. The normal-looking external iliac vein was identified and was followed upward across the site of the internal iliac vein in order to expose the common iliac vein. The latter, like the external iliac, appeared uninvolved and was isolated to the level of the promontory of the sacrum. Great care was taken to avoid manipulation in the region of the junction of the internal iliac with the common and external iliac veins, because some infiltration was noted at this site and the dislodgment of thrombi was feared. A temporary clamp was placed on the common iliac vein, another on the external iliac vein a short distance above Poupart's ligament. The region of junction of the internal with the common iliac vein was then explored. Infiltrated tissue could be felt encircling the internal iliac vein and the vein was obviously the seat of an extensive inflammatory process. It was also fair to assume that the lesion was a suppurative thrombophlebitis. Accordingly, the common iliac vein was divided between ligatures. A most interesting occurrence then took place, for there escaped a well-defined thrombus about one-quarter of an inch in each diameter when the vein was severed. The thrombus evidently was derived from the phlebitic area and had been accidentally trapped in the blood between the two ligatures on the common iliac vein. It is a striking piece of direct evidence of the actual size of thrombi which may break off from the feeding thrombophlebitic zone to enter the circulation. After the division of the common iliac vein between ligatures the external iliac vein was similarly divided a short distance above the inguinal canal. The common and external iliac veins were then dissected free down to the junction with the internal iliac vein. The latter was a massive, thick-walled, immobile stump. It could only be freed for a short distance and was then cut across. Where transected, the internal iliac vein was still grossly altered and thrombus-bearing. However, its further dissection, technically difficult, appeared unwarranted because the connection with the systemic circulation via the common and external iliac veins was completely cut off. Operation was therefore discontinued at this point. The retroperitoneal space was lightly packed

with gauze, a sheet of rubber dam being placed next to the peritoneum. The wound was sutured about the drains.

When the specimen was laid open, the common and external iliac veins appeared normal. In striking contrast, the mouth of the internal iliac vein presented a prominent adherent thrombus. The latter was about one-half an inch in each diameter and projected beyond the lumen for a distance of another half inch. Microscopically the lesion was a suppurative thrombophlebitis with gram positive cocci in the wall of the vein as well as in the thrombus. Only the adjacent portions of the external and the common iliac veins presented microscopic evidences of phlebitis. The free thrombus that was trapped between the two ligatures on the common iliac vein was found to be an infected thrombus containing gram positive cocci.

The postoperative course was uneventful. Fever disappeared in a few days. The postoperative blood culture was sterile. There was progressive improvement in the general condition, satisfactory healing of the extraperitoneal wound, and slow closing of the original posterior wound through which the bullet had been removed. The patient was discharged with an anterior healed wound and a small posterior sinus.

There are three features of this case to which attention may be directed. The first is the prompt disappearance of a septic state following an operative procedure for a suppurative thrombophlebitis of the internal iliac vein. The described operation of excision of the common and external iliac and partial excision of internal iliac veins for the treatment of thrombophlebitis appears to be unique in the literature of the surgical management of thrombophlebitis. The second is the proven large size of the infected thrombus which can be discharged into the circulating blood from a thrombophlebitic area. The implications are obvious. The third feature worthy of special emphasis because of its clinical significance is the absence of postoperative edema in the leg. At no time after operation was there any edema discernible in the lower extremity and none is present now, one year after operation. The widely held belief that edema can be due to blockage of main venous trunks is not only disproven by this case but also by other instances on the surgical service of excision of main venous trunks of extremities for thrombophlebitis (1). It must be assumed that edema in cases of phlebitis of the extremities is due to lymphatic obstruction alone. At any rate simple venous occlusion is not the cause of edema. Once this fact is more generally realized the surgical approach to main venous trunks will be on a more logical basis than exists at the present time. When indicated, operations involving the ligation or excision of such main veins will be performed without fear of a crippling edema so generally assumed to be a probable sequel.

REFERENCE

(1) Neuhof, Harold: The Diagnosis and Operative Control of Acute Pyogenic Phlebitis Complicated by General Septic Invasion. Ann. Surg., 97: 808, 1933.

HEPATIC DISTOMIASIS PRODUCED BY FASCIOLA HEPATICA

PEDRO N. ORTIZ, M.D.

[*Service of Dr. B. S. Oppenheimer*]

This case is presented because of the unusual infestation of man by the parasite, fasciola hepatica, which usually infests cattle, sheep and herbivorous animals and also because of the invasion of the vitreous of the eye by young larvae, producing calcification with subsequent impairment of vision. These larvae are unable to develop and grow to maturity outside of their selective anatomical habitat, the bile ducts. Only 110 cases of human hepatic distomiasis have been reported throughout the world up to May 1932.

CASE REPORT

History (H. N. 369455). A 29 year old, Puerto Rican was referred to the hospital with a diagnosis of hepatic distomiasis on August 3, 1934. He had lived in a region of Puerto Rico where the disease in cattle is endemic. During the two and a half years before admission, the patient experienced gradual loss of weight, weakness, jaundice, anorexia and general malaise. At the same time the patient's vision failed slowly. Muscae volitantes appeared in his field of vision, and blurring and haziness prevented him from reading. He was observed at the School of Tropical Medicine of Puerto Rico from August 11 to November 11, 1933. The final diagnosis there was: Fasciola hepatica infestation; syphilis of the nervous system (?); diabetes insipidus (?); iritis; synechia; malnutrition; and secondary anemia.

Following a bilateral swelling in the zygomatic region there developed a paralysis of the left side of the face. At this time pain in the abdomen accompanied by gas was a prominent symptom. Accumulations of grayish, thick saliva in the mouth compelled the patient to spit continually. These symptoms were accompanied by intense thirst, polyuria both diurnal and nocturnal, nausea, vomiting, and complete anorexia. The stool was slimy, gelatinous, of a greenish brown color, and although soft, bowel movements occurred only at three to four day intervals. He lost sixty pounds in two and a half years and acquired the appearance of one chronically ill.

Examination. Eyes: Right pupil was irregular and reacted to light and in accommodation. The left pupil was irregular, large, and fixed by posterior synechiae to the lens. There were several opacities in the posterior corneal layers. The anterior chamber was very deep and the lens was

thickened and somewhat opaque. The right lens showed evidence of cataract of early formation. The sclera were thickened. The calcified larvae of fasciola hepatica were seen in the vitreous of both eyes.

Ears: The right drum was scarred.

Genitalia: A scar was present at the base of the penis on the dorsal aspect. There were large nodes and an old scar in the right groin.

There was facial tick on the left side, probably due to an old Bell's palsy.

Laboratory data. Blood: Hemoglobin, 84 per cent; red blood corpuscles, 5,130,000; white blood corpuscles, 8,350; polymorphonuclears segmented, 55 per cent; nonsegmented, 12 per cent; lymphocytes, 24 per cent; monocytes, 5 per cent; eosinophiles, 3 per cent; basophiles, 1 per cent. The Wassermann and Kahn tests were negative.

Blood chemistry: Cholesterol, 170 mg.; cholesterol ester, 85 mg.; sugar, 95 mg.; urea nitrogen, 19 mg.

Urine: Specific gravity, 1006 to 1012; no sugar; no albumin; 3,500 cc. passed in twenty-four hours.

Stool: Guaiac test, negative; ova of fasciola hepatica present. The largest number of eggs was found in a specimen which was soft, slimy, and greenish brown. The average number of eggs per cover slip 1 inch square was 430. Occasional eggs of the trichocephalus dispar were also found. Gastric analysis showed nothing abnormal. Blood Van den Bergh: Direct, negative; indirect, 0.2 mg. bilirubin per 100 cc. Ova of the fasciola hepatica were also found in the bile obtained by duodenal drainage.

Course. The patient stayed at the hospital from August 3 to August 16, 1934. Although no specific treatment was given, his general condition improved with rest and feeding. In view of the good results obtained in Cuba by the administration of emetine hydrochloride, claimed to be a specific (1), injections of 0.03 g. were given in doses of one a day. The number of injections constituting one course of treatment has been limited to eighteen. Repeated examination of feces, carried out twice a week up to December 6 after the patient had received twenty-four injections, showed no eggs. He gained thirty pounds and feels well.

COMMENT

This is a case of hepatic distomiasis occurring in man and caused by the fasciola hepatica, a "chance parasite" of man and a common parasite of cattle, sheep, and other herbivorous animals in many regions of the world. As the disease is slow and insidious in its course and as the general symptoms and signs are common to other chronic diseases, its presence is not usually suspected. Frequently well known parasites and ova are also found in the feces of the patients, and this accidental finding obscures the diagnosis of this rare disease. It is not unlikely that many more cases could be discovered in endemic regions if the feces or bile of suspected patients were examined for the eggs of the fasciola hepatica by competent observers.

The adult parasite is large, flat and oval, leaf-like in shape; twenty to thirty millimeters long, and ten to fifteen millimeters wide. Unlike the blood flukes, the fasciola hepatica is hermaphroditic. It lives in the biliary ducts of the liver where it arrives via the duodenum in the young larval stage. Reaching maturity, it lays its eggs in the ducts, and these are carried down with the bile into the intestines to be expelled in the feces.

The life cycle of the fasciola hepatica is extremely complicated, and certain conditions are necessary for its development and survival. In the first place, the egg is hatched in fresh water only under a favorable temperature producing a conical, ciliated larva, *miracidium*, which swims freely. This ciliated larva dies within a few hours if it does not find its proper intermediate host, the snail (*limnaea truncatula* in Europe and *limnaca humilis* in North America). It bores its way through the tentacles of this mollusk into its pulmonary chamber, and after a further cycle of development, it enters the liver of the snail where it is converted into *rediae*. Another cycle of development takes place there producing cercariae. This forms the infective stage of the parasite. The *cercariae* become encysted in water and on the surface of aquatic plants, such as watercress, shortly after having abandoned the intermediate host. Man contracts the disease probably by drinking contaminated water, by eating watercress, which is an aquatic perennial herb, or by eating vegetables which have been sprinkled with water containing the cysts. The method of infestation, both in man and animals, is ingestive and not penetrative. The mature larva escapes from the cyst and reaching its habitat, the bile ducts, grows to adulthood.

The larva of the fasciola hepatica tends to be migratory before attaining maturity. In the patient here described the bilateral swellings in the zygomatic region and the presence of silvery-white opacities, consisting of conglomerations of small spherical bodies, in the lower portion of the vitreous of both eyes are probably the result of the invasion of these regions by the young larvae. Being outside of their natural environment and unable to develop, they die in situ and, following calcification, act as foreign bodies. A century ago this accidental invasion of the eye gave rise to the belief that a specific type of distoma was responsible for the eye lesions, and three different names were advanced for this condition: Distoma Ophthalmicus (Diesing, 1830), Monostomun Lentis (Von Nordmann, 1832) and Distomus Oculi Humani (Ammon, 1833) (2).

The above case exhibits all the cardinal symptoms of the disease: hepatic and gastrointestinal disturbances, general debility, and a nervous lesion with twitching of the face muscles on the left side, the result of an old Bell's paralysis that made its appearance during the acute stage. The eye lesions complete the picture and correspond to the three distomae of the older authors mentioned above.

The diagnosis of the disease is based exclusively upon finding the eggs

in the feces or in the bile obtained by duodenal drainage. The largest number of eggs is obtained when the stool is slimy, soft, gelatinous, and of greenish brown color. It is possible that a greenish-brown substance, slimy in nature, irritating to the mucous membrane of the intestine, is excreted by the parasite probably during the act of ovulation. At the height of the process of ovulation the patient had always complained of burning in the

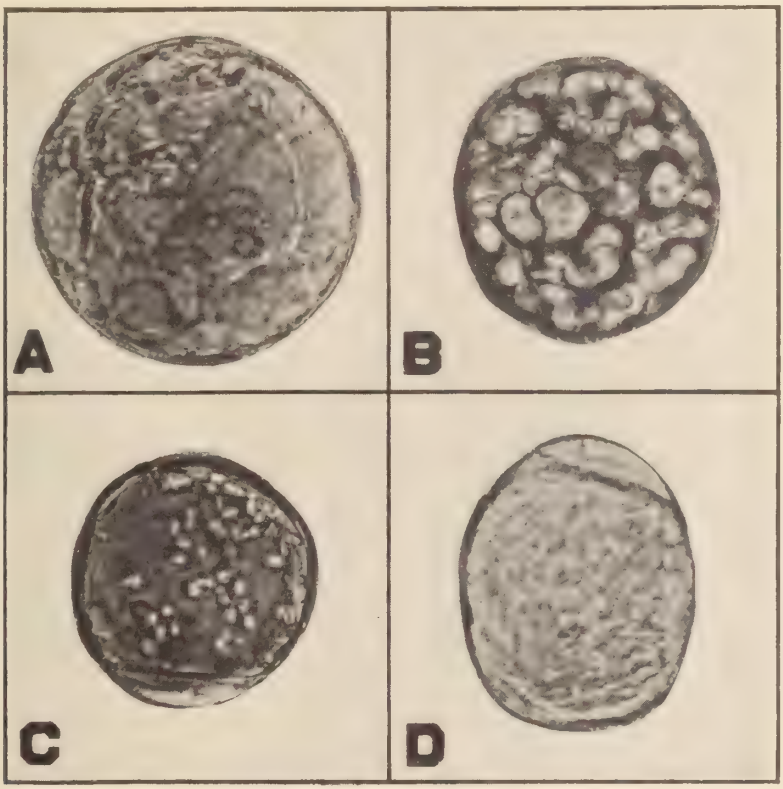


FIG. 1. Eggs of Fasciola Hepatica, 4 stages of development (human case).
A. Fresh egg. Vitellus is not segmented.
B. Beginning segmentation of the vitellus.
C. Operculated egg—morula (8 weeks old).
D. Typical operculated egg, morula stage (8 weeks old).
Photomicrographs ocular 8 × objective 4 mm. Enlarged 3 times.

rectum. At such times the number of eggs was greatest, and on one occasion there were 430 eggs per 1 inch square cover slip.

As in the case of *schistosoma mansoni*, *hematobium* and *japonicum*, tap water at room temperature is the natural culture medium for the eggs of the fasciola hepatica. Consequently, the sedimentation concentration method is the best laboratory procedure at our disposal for the examination of the feces. The sediment obtained from one gram of feces properly

mashed in eight ounces of tap water and strained through an 80 mesh sieve can be kept in a two ounce flask filled with water for further study and observation. Specimens taken at weekly intervals may be kept in the laboratory in properly labelled flasks for the study of the development of the eggs. The water is changed every other day in order to provide a fresh supply of oxygen, as well as to check the multiplication of free swimming flagellates.

The egg of the parasite varies in size, shape, inner structure, consistency, and outline even in the same specimen of stool. This may be due to the fact that some of the eggs are probably not carried down with the bile into the intestines on the day they are passed by the parasite, and when expelled have already undergone gross segmentation (fig. 1 B). In the fresh egg (fig. 1 A) the vitellus is more or less homogeneous as the process of segmentation has not yet begun. There is another type of egg which seems to be unfertilized and does not develop. Its shape is irregular; it contains a very small amount of material arranged in several clumps. In a freshly fertilized egg the vitellus fills the egg membrane, and gross segmentation appears early and continues unchecked in an orderly fashion. In a fresh preparation, the eggs appear spherical rather than oval, and the operculum may sometimes be seen. As in the eggs of the *Diphyllobothrium latum* (fish tapeworm), this operculum should not be looked for as a constant feature. The most perfect egg of the fasciola hepatica, even in the morula stage, does not always show the lid which schematic and semischematic pictures in books depict. Fortunately, it was possible to find and to arrange under the microscope the eggs which appear in figures 1 C and 1 D. Care must be exercised in handling eggs as the mature eggs are exceedingly frail and even the fresh ones may break if the cover slip is not placed gently over the slide, the contents rushing out in a continuous stream of vitellus which stains pink with a solution of eosin.

The dietary habits of patients as well as the microscopic appearance of vegetable cells, fibres, and other artefacts should be known to the parasitologist. The sediment obtained from one gram of feces mashed in eight ounces of water, even after careful straining, contains a large quantity of vegetable cells, particularly those of green peas. These cells may easily be mistaken for the typical segmented ovum of the fasciola hepatica, just as cells of the plantain (musa paradisiaca) simulate eggs of the schistosoma mansoni. By adding a small drop of a saturated solution of eosin in saline to the specimen, this confusing factor may be overcome. All vegetable cells stain a uniform faint red color, while the eggs of the fasciola hepatica being impervious to this solution appear, under a 6 × ocular and a 16 mm. objective, as silvery white spherules or ovoid bodies.

BIBLIOGRAPHY

(1) Kouri, P. and Arenas, R.: La Distomatosis Hepatica en Cuba 1: 120, 1932.

(2) Castellani, A. and Chalmers, A. J.: Manual of Tropical Medicine, Ed. 3. New York City, William Wood and Company, 1919, p. 567.

BENIGN HYPERNEPHROMA OF THE KIDNEY

LEO EDELMAN, M.D.

[*Surgical Service of Dr. Edwin Beer*]

A small benign hypernephroma of the kidney is not an infrequent finding at the necropsy table. The larger ones are relatively rare and raise the question of procedure when unexpectedly encountered during the course of an operation for a condition which in itself does not require nephrectomy. The following case presented such a problem which was met by the enucleation of the tumor, the patient remaining well now almost four years.

History (H. N. 321391). A married white woman, aged 35, was admitted on December 19, 1930, complaining of repeated attacks of pain in the right lumbar region radiating to the groin and down the thigh. The first attack occurred four months prior to admission and recurred at intervals of three to four weeks lasting several days with relief of pain only after an injection of morphine. There was no urinary frequency, dysuria, or gross hematuria.

Examination. The right kidney was palpable and tender. The urine sediment contained an occasional pus and red blood cell. The blood urea was 7 milligrams per 100 c.c. A roentgenogram of the genito-urinary tract showed a concentric calculus 2 cm. in diameter in the right kidney pelvis. Cystoscopic examination revealed a normal bladder with normal ureteral orifices. The ureters were not obstructed. The specimens of urine collected from both kidneys were clear, showed good indigo carmine excretion, and microscopically the urine from the right side showed an occasional pus cell. There was some retention in the right kidney pelvis on ureteral aspiration. A retrograde pyelogram showed moderate dilatation of pelvis and calyces and the presence of a calculus in the right kidney.

On December 23, 1930 the patient was operated upon for the removal of a right renal calculus. The kidney appeared normal but somewhat elongated. The calculus was removed through a posterior pyelotomy. A subcapsular tumor in the region of the upper pole was found. The renal capsule was incised, and an encapsulated tumor 3 by 5 cm. in diameter was easily enucleated. Oozing was readily controlled with a hemostatic suture. The tumor appeared well circumscribed, yellow, and composed of several small nodules ranging in size from $\frac{1}{2}$ to 2 cm. in diameter strongly suggestive of a benign adenoma or fibrolipoma. The discrete encapsulation of the tumor and the lack of involvement of the renal tissue led to the decision against nephrectomy. The wound was closed with drainage. The pathologist reported the growth a benign hypernephroma (fig. 1).

The patient made an uneventful postoperative recovery. Repeated intravenous pyelography since the operation shows a normal right kidney. The slight dilatation of the renal pelvis persists.



FIG. 1. Photomicrograph of tumor showing fibrous capsule and structure typical of hypernephroma (high power).

COMMENT

The origin of hypernephromata in the kidney is still obscure. Grawitz's view that they arise from misplaced adrenal tissue (aberrant heterotopic hypernephroma or struma lipomatodes aberrata renis) is disputed by Su-

deck, Stoerk, and others. These claim that, like adenomata, they are renal rather than adrenal in origin. Ewing does not entirely eliminate the adrenal-rest theory.

Benign hypernephroma (Kaufmann) varies in size from a small cherry to a walnut, is sulphur yellow, rounded, encapsulated and is located in the renal cortex near its periphery bulging into the renal capsule. It is considered benign as long as the capsule remains intact and there is no extension into the renal pelvis or renal veins. Resection of tumors of the kidney is not frequently practised. The usual treatment is nephrectomy if the other kidney is normal. Kretschmer and Doehring resected an alveolar adenoma from a kidney, the patient being alive and well four years after operation. Cunningham removed a papillary cystadenoma, patient being alive and well one year and ten months after resection.

SUMMARY AND CONCLUSION

A fairly large benign hypernephroma was found in a kidney of a patient operated upon for renal calculus. The normal cystoscopic and pyelographic findings, the favorable location and the encapsulation of the tumor led the operator to be content with enucleation rather than nephrectomy. The patient is well three years and nine months after operation.

REFERENCES

(1) Cunningham, J. H. and Swan, C. S.: Papillary Cystadenoma of the Kidney. Tr. Am. A. Genito-Urin. Surgeons, 22: 25, 1929.

(2) Ewing, J.: Neoplastic Diseases. Ed. 3, Philadelphia, W. B. Saunders Co., 1928, p. 798.

(3) Kaufmann, E.: Pathology for Students and Practitioners. Philadelphia, P. Blakiston's Son & Co., 1929, Vol. II, p. 1395.

(4) Kretschmer, H. L. and Doehring, C.: Adenoma of the Kidney. Surg., Gynec. & Obst., 48: 629, 1929.

THROMBOSIS OF PULMONARY VESSELS IN POLYCYTHAEMIA VERA

DANIEL POLL, M.D.

[*Service of Dr. George Baehr*]

Thrombotic closures of arteries have long been known as a common complication in polycythaemia vera. Osler (1) in his earliest articles called attention to this fact. The following case is reported as an example of an unusual site for this accident. Since the patient recovered from the effects of this thrombosis, the diagnosis has been made entirely on clinical grounds but nevertheless seems well substantiated.

CASE REPORT

History (H. N. 360645). A fifty-four year old married, Russian woman was admitted to the hospital, complaining of difficulty and frequency in voiding urine. Three years previously, without any premonitory symptoms, she suddenly became ill and lost consciousness. On reviving it was found that she had lost the power of speech, could not walk and her right hand was paralyzed. Complete recovery ensued in three months, but since that time she has had recurrent episodes of mental confusion and loss of memory. She noticed that the palms of her hands had been very red for the past two years. For three weeks before admission to the hospital she had been troubled with increasing frequency of urination coupled with severe burning pain on voiding. She had fever since the onset of her present illness.

Examination. Her face and the palms of her hands showed a distinct florid color. The mucous membranes of the conjunctivae and pharynx were brick red. No signs were found in the heart or lungs. The liver and spleen were both enlarged, the latter reaching about 4 cm. below the costal margin. The patient was markedly tender in the left costovertebral area. The temperature was 104°F., the pulse 106, and respirations 24. The blood pressure was 110 systolic, 92 diastolic.

A blood examination showed the following: hemoglobin, 124 per cent; red blood corpuscles, 9,250,000; platelets, 620,000; white blood cells, 18,200; polymorphonuclear neutrophiles, 89 per cent.

Chemical blood analyses showed the following: urea 22 mg. per 100 c.c.; sugar 125, and CO_2 combining power 38.5 volumes per cent. The blood Wassermann test was negative; the icteric index was 9. The urine was alkaline and contained large amounts of pus.

Course. The diagnosis was acute left pyelonephritis in a patient with polycythaemia vera. X-ray examination of the urinary tract showed no stone, and urine culture yielded Bacillus Coli.

The treatment consisted of the following:

(a) Phlebotomy—375 c.c. removed; the blood clotted easily.

(b) Acidification of the urine by ammonium chloride and diet. This was stopped as the blood CO_2 began to fall too rapidly. The urine began to clear, but on account of the persistent temperature it was decided not to cystoscope the patient at this stage of the illness. After three weeks the urinary symptoms had abated though the temperature had not reached normal. It was thought that she was recovering. Two days later she experienced sudden sharp pain in the left lower chest and bloody expectoration. There was little cough, no prostration and no dyspnea. The white blood count at that time was 19,000 and the polymorphonuclear portion 78 per cent. There were only scattered fine râles over the left lower chest with a small area of dullness at about the center of the lobe. Two days later bronchial voice and breathing were heard over this area. Owing to the absence of frank signs of lobar or lobular consolidation and the absence of dyspnea with either increased temperature or cyanosis, prostration, or further elevation of the white blood count, the diagnosis of thrombosis of the pulmonary vessels rather than that of an infectious pneumonia was made. Roentgen examination showed only a small area of consolidation in the left lower lobe with marked prominence of the pulmonary vessels. Showers of râles appeared over the left lower and right upper lobes, and in one week the lung signs had disappeared, and the temperature fell to normal. Cystoscopy disclosed cystitis; both kidneys were found to be functioning well. Bladder irrigations cleared up the cystitis. At the time of discharge the blood count was as follows: red blood cells 6,100,000; hemoglobin 110 per cent. The polycythaemia is being treated at present with pyrodine.

COMMENT

Thrombosis of the pulmonary vessels occurs most frequently in primary hypertension of the lesser circulation with its concomitant atherosclerosis. Here the accident is associated with pronounced heart failure. In pulmonary tuberculosis congenital and inflammatory lesions of the pulmonary valves, typhoid fever, and as a postoperative complication, thrombotic closures of the pulmonary vessels have been reported. Its occurrence in *polycythaemia vera* is unusual.

REFERENCE

(1) Osler, William: Polycythaemia Vera. Lancet, 1: 143, 1908.

INDUCED PNEUMOPERITONEUM FOR THE DETECTION OF ABDOMINAL METASTASIS

MORRIS A. GOLDBERGER, M.D.

[*Gynecological Service of Dr. Robert T. Frank*]

The introduction of air into the peritoneal cavity is a useful procedure for the roentgenologic visualization of metastatic masses in the abdomen. It is especially advantageous when coexisting ascites, as in the following case, does not permit of their recognition by the usual methods of examination.

CASE REPORT

History (H. N. 369266). An unmarried white female, 23 years of age, was admitted to the hospital, March 25, 1933. She complained of recurrent abdominal pain and fever. Her menses began at the age of 12, were always irregular, every 3 to 5 weeks, and lasted from 3 to 4 days. Her last period was 4 days before admission. For the past 6 years she had had attacks of right lower quadrant pain radiating to the back and recurring at irregular intervals.

Examination. The general physical examination was essentially negative. On gynecological examination the labia minora appeared irritated, and there was slight vaginal bleeding. The uterus was normal in size and pushed downward and to the right by a cystic mass above it. This mass filled the left half of the pelvis and extended to the right. It was definitely fluctuant and tender on palpation. The sedimentation rate was 20 minutes. The blood count showed 14,000 white blood corpuscles with 90 per cent polymorphonuclear neutrophiles.

Course. The diagnosis of twisted ovarian cyst was made and a right salpingo-oophorectomy for a twisted cystic tumor of the right ovary was performed on the day of admission. The peritoneal cavity contained about 6 pints of straw-colored fluid. The tumor was found to arise from the right ovary and was impacted in the pelvis. It measured 10 cm. in diameter, was soft, edematous, friable and varicolored. In the process of removal the tumor ruptured, and some of its contents was spilled. The left ovary and tube appeared normal; there were no implantations on the peritoneum. The tumor was reported by the pathologist as a cystadeno-carcinoma.

The patient, having received sixteen deep X-ray treatments to the anterior pelvis and the right and left gluteal areas, was discharged from the hospital on April 22, 1933. The gynecologic examination at this time showed no evidence of any disease. She received nineteen more X-ray

treatments and was seen regularly by our Follow-up Clinic. There was no sign of recurrence of the disease until July 25, 1934 when the patient noticed that her girth had increased and that she had gained twenty-four pounds in weight. Progressively increasing ascites was then recognized, and she was readmitted to the hospital on August 3, 1934.

Paracentesis abdominis was performed and 2,000 c.c. of blood-tinged fluid were withdrawn. There were no masses felt through the abdomen or

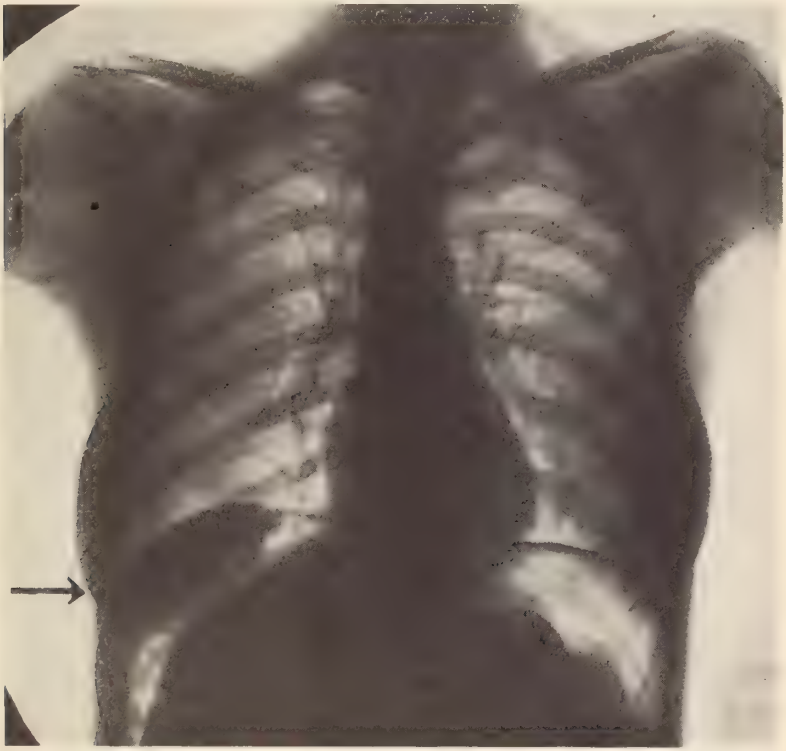


FIG. 1. Peritoneal pneumogram. Air under both domes of the diaphragm. Arrow points to a large irregular mass outlined underneath the right dome of the diaphragm: it appears as a black shadow, due to the fact that the print is made directly from the film.

by pelvic examinations before or after the paracentesis. Another series of X-ray treatments was instituted. On August 16th there was a reaccumulation of fluid, and the patient experienced discomfort and pains in the upper abdomen; again, no masses were felt. The family doctor, who was a near relative, insisted that an operation be performed. While it was felt that the ascites was due to metastases and that the condition was inoperable, one could not be certain of the extent of the disease since no tumor masses could be felt. It was then suggested that a peritoneal pneu-

mogram might outline tumor masses. Paracentesis abdominis was performed with the removal of 5,000 c.c. of blood-tinged fluid. This was followed by the introduction of 2,000 c.c. of carbonic acid gas through the paracentesis cannula. The Rubin apparatus was here utilized to measure the quantity of gas introduced and to control the pressure.



FIG. 2. Peritoneal pneumogram. Lateral view outlining metastatic masses attached to the left abdominal wall. They appear as black shadows, due to the fact that the print is made directly from the film, where they are grayish-white islands.

A roentgenogram (fig. 1), taken immediately after the pneumoperitoneum showed a large irregular mass below the right diaphragm, diagnosed by the roentgenologist as a "metastatic deposit in view of the patient's previous history."

The ascites recurred, and by September 12th another parencentesis ab-

dominis was performed, and 7,000 c.c. of blood-tinged fluid were withdrawn. Two thousand cubic centimeters of carbonic acid gas were then introduced into the peritoneal cavity through the paracentesis cannula. An X-ray film (fig. 2) showed the liver well outlined and normal in size and shape. The spleen was visualized, slightly enlarged, and also normal in contour. There were many tumor masses outlined as though attached to the sides of the abdominal wall as well as to both leaves of the diaphragm. These masses varied in size from $\frac{1}{2}$ cm. to 5 cm. in diameter and had the appearance of peritoneal metastases.

At her request she was allowed to return home where she remained but a few days, as on September 30th she was brought to the Montefiore Hospital in coma and died soon after admission. The necropsy disclosed metastatic carcinoma of the left ovary, broad ligament, omentum, mesentery, peritoneum, mesenteric and hepatic nodes, diaphragm and pancreas; hemorrhagic ascites (3,500 c.c.); peritonitis (recent fibrinous); erosion of splenic vessels by tumor (?); and parenchymatous degeneration of the liver and kidneys.

COMMENT

The roentgenograms following pneumoperitoneum were interpreted as presenting evidence of metastases, as was fully demonstrated by the necropsy findings.

RADICAL RESECTION OF THE FRONTAL BONE FOR OSTEOMYELITIS FOLLOWING ACUTE SINUSITIS

IRVING B. GOLDMAN, M.D.

[*Service of Dr. Rudolph Kramer*]

History (H. N. 342983). A boy ten years of age entered the hospital January 3, 1934. He was well until six days prior to admission when he suddenly took sick with a slight chill and with symptoms of an acute upper respiratory infection. Two days later his left eye became swollen and his lids edematous. His temperature at first fluctuated between 100° and 103°F. On the night before admission he vomited, had two shaking chills and had a rise in temperature to 106 degrees.

Examination. The right and left upper lids were red and swollen. Over the bridge of the nose and extending to about one inch on the forehead and a little to the right of the midline there was present a pale tender swelling. Both frontal sinuses were tender. The nasal mucous membrane was congested, and there was creamy pus in both middle meati. The fundi showed hyperemic nerve heads. The spleen was palpable. The white blood cell count was 7,500 with 80 per cent of polymorphonuclear neutrophils. X-ray examination of the sinuses (fig. 1) disclosed a marked clouding of the antrum, ethmoid and sphenoid on the left side. The left frontal sinus was small. There was no right frontal sinus, but a moderate sized supraorbital ethmoidal cell was present.

Course. During the first day in the hospital the edema of the left eye subsided considerably, while that of the right eye progressed to such a degree as to close it. His temperature, which had previously dropped, rose again to 105 degrees. Forty-eight hours later the progress of the disease made an external operation necessary.

Operation. The child was given a general anesthetic; a post-nasal plug was introduced; the skin surface was prepared with picric acid; a butterfly incision was made which included both eyebrows, the line of incision running from below the inner canthus of each eye upward and outward, just below the orbital ridge, through the unshaved eyebrow and then both right and left incisions connected by a horizontal incision just below the glabella. The flaps were retracted and the frontal bone was brought into view. The periosteum was absent and the exposed bone appeared to have a dead-white color. A pin-point opening was seen in the anterior wall just above the region of the interfrontal septum. With a Hudson trephine a portion of bone was removed just above the mesial border of the right supraorbital ridge. A few drops of pus and thrombosed vessels were seen

in the bone as it was being elevated. After more frontal bone was removed an immature right frontal sinus was brought into view. The sinus was filled with pus. The left frontal sinus was exposed, and this also contained pus. The remainder of the frontal bone was removed until normal appearing bone was encountered; this necessitated a resection of bone for a distance of about three inches in each direction. The exposed dura appeared



FIG. 1. Roentgenogram of sinuses before operation, showing a cloudy antrum, ethmoid, and sphenoid on left side. The right supraorbital cell was found at operation to be an immature right frontal sinus filled with pus.

to be somewhat full. The entire cavity was packed with iodoform and left wide open.

The postoperative course was uneventful. The temperature gradually fell so that it became normal on the fourth day. The swelling and redness about the eye subsided rapidly. The temperature stayed normal, and there was no recurrence of any symptoms during the stay in the hospital. Twenty-three days after the operation a secondary suture was performed and the skin edges were approximated. X-ray of sinuses now showed a large postoperative defect but no evidence of bone disease. The wound healed completely in about a week, and three days later (thirty-four days after the original operation) the child was discharged in good condition.

COMMENT

This case demonstrates the existence of extensive early bone lesions of the skull without corresponding X-ray changes. When X-ray changes are already present, one must presume that there is involvement beyond the area visualized on the film. From inspection of the roentgenogram taken before operation (fig. 1) the amount of diseased bone cannot be estimated, but the postoperative roentgenogram (fig. 2) reveals the real extent of the lesion by showing the amount of diseased bone removed.

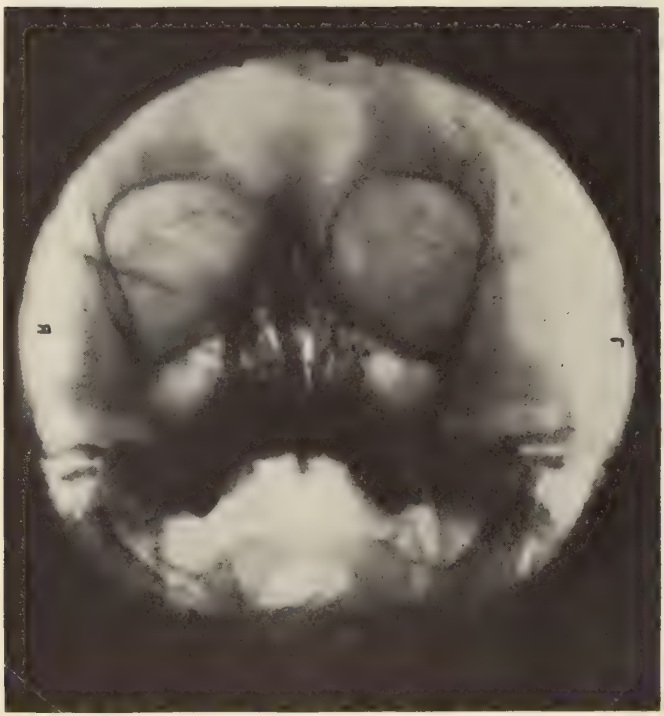


FIG. 2. Roentgenogram of the frontal sinuses three weeks after operation, showing a large bony defect. Most of the bone removed was diseased with the exception of a narrow zone of healthy bone at the periphery. No bone disease is now seen and both frontal sinuses are obliterated.

Early operation is advisable when osteomyelitis is present. Radical investigation must be instituted at the start so that all the diseased bone and a region of healthy bone be removed. The relatively unnoticeable scar and the small deformity of the forehead which results is gratifying.

This case is recorded because it emphasizes the need of a radical surgical approach in osteomyelitis of the skull complicating a neighboring acute suppurative frontal sinusitis. The conservative attitude dominant in the past will in time yield to the more radical intervention which was carried out in the case cited.

THE BASAL METABOLIC RATE IN A PATIENT WITH CORONARY ARTERY THROMBOSIS WHEN PLACED ON AN 800 CALORIE DIET

ARTHUR M. MASTER, M.D., HARRY L. JAFFE, M.D., AND SIMON DACK, M.D.

[*From the Cardiographic Laboratory and the Service of Dr. B. S. Oppenheimer*]

Blumgart, Levine and Berlin (1) have advocated complete thyroidectomy for patients with congestive failure and angina pectoris. Their purpose is primarily to keep the patient's basal metabolic rate between −20 and −30 per cent.

We have now placed ten patients suffering from coronary artery thrombosis or severe anginal syndrome on a diminished food intake, specifically, on an 800 calorie diet. The experiments in four patients have now progressed far enough, with control intervals, to state that we have succeeded in lowering their basal metabolic rates at least to −20 per cent on the low diet. The following case is reported as an example of the principle.

CASE REPORT

The patient was a man of 59, (H. N. 372629) a presser by trade. A year and a half ago he had had a cholecystectomy performed. There was a definite history of hypertension for at least three years. For a year previous to admission to the hospital there had been occasional precordial discomfort after exertion and shortness of breath. On the evening of October 24, 1934 he experienced pain over his heart. Nevertheless, he went to work the next day, but at seven o'clock in the evening he developed excruciating pain over his heart, he "writhed" in agony and perspired freely. A physician was called, who gave the patient a hypodermic injection of morphine and sent him to the hospital.

The man was a hyposensitive individual, very sick, with an ashy gray color, cyanotic lips and fingertips. There were fine crackles heard at both bases. The heart was not enlarged. The heart sounds were embryocarditic and a gallop rhythm was present. The second aortic was louder than the second pulmonic. The blood pressure was 180 systolic and 110 diastolic. The retinal arteries were definitely narrowed. The patient was so uncomfortable and cyanotic that an oxygen tent was used. On October 26, the temperature was 102°F., the white blood cell count was 19,800 with 83 per cent of polymorphonuclear neutrophiles. The electrocardiogram showed RS-T and T-wave changes in lead I. On October 29,

the venous pressure was 8.5 cm.; the "ether arm to lung" time was 6 seconds; the saccharine circulation time was increased to 20 seconds and the vital capacity was but 1200 c.c. The patient slowly improved; his blood pressure fell to 110 systolic and 66 diastolic; the vital capacity increased to 3700 c.c. by November 24, and the patient was permitted out of bed November 25, and discharged fully able to walk on December 11, 1934. He has returned regularly for examination and basal metabolic readings.

The patient had been placed on an 800 calorie diet immediately upon admission and the fluids limited to 1000–1200 c.c. A glance at the accompanying chart will show that on an 800 calorie diet the basal metabolic rate was −12 per cent on the eighth day, −21 per cent on the sixteenth day. On the twenty-ninth day in the hospital the patient was placed on a

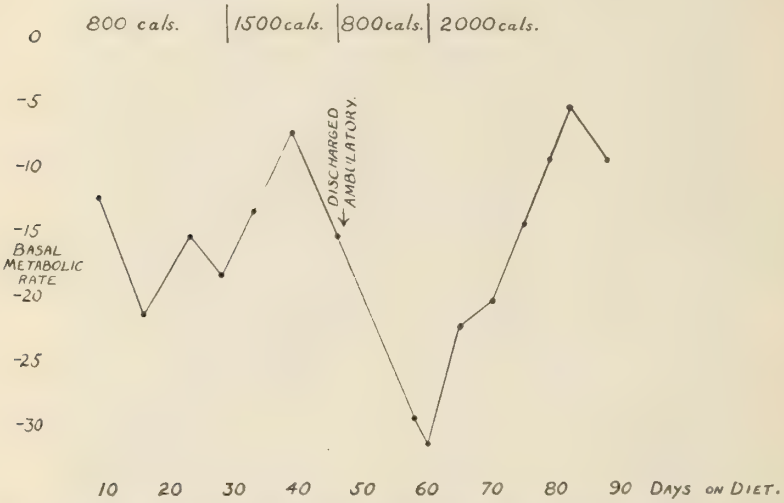


FIG. 1. Chart showing the relation between basal metabolic rate and caloric intake.

1500 calorie diet and the basal metabolic rate rose to between −15 per cent and −7 per cent. When discharged seventeen days later, he was again placed on the 800 calorie diet. The basal metabolic rate fell to −29 per cent and −31 per cent. For another control interval the patient was given a regular diet and it will be seen that the basal metabolic rate has risen steadily to −9 to −5 per cent.

COMMENT

Not only are the laboratory findings of note but the clinical symptoms are also of interest. During the periods of 1500 and 2000 calorie diets the patient complained bitterly that his food caused distention of his stomach and precordial pain and it required some persuasion to keep him on the

regular diet. This is all the more important because during the first three weeks of his hospital stay he constantly complained that he was hungry and asked for more food.

The basal metabolic rate results are suggestive for two reasons. First, it is shown that in a patient with coronary thrombosis placed on an 800 calorie diet the basal metabolic rate may be lowered just as in a normal person. In fact, in congestive heart failure, in cardiac diseases with marked dyspnea and in cases of diastolic hypertension the basal metabolic rate is often elevated. Secondly, it may be that a lowered food intake will produce for a period of one to three or more months what a total thyroidectomy will do permanently, that is, lower the basal metabolic rate and diminish the work of the heart. The low diet appears harmless and is of benefit clinically in preventing gastro-cardiac or intestinal-cardiac reflexes.

It has been observed that it requires about two to three weeks before the basal metabolic rate falls to −20 per cent. Similarly, when the patient returns to a regular diet the basal metabolism remains quite low for about the same interval of time before it begins to rise.

REFERENCE

(1) Blumgart, H. L., Levine, S. A., and Berlin, D. D.: Congestive Heart Failure and Angina Pectoris. The Therapeutic Effect of Thyroidectomy on Patients without Clinical or Pathological Evidence of Thyroid Toxicity. Arch. Int. Med., 51: 866, 1933.

SCHMINCKE TUMOR

WILLIAM NEEDLES, M.D.

[*Service of Dr. Israel Strauss*]

The pathologic characteristics and clinical syndrome of Schmincke tumor have only comparatively recently been established. The following case is instructive in that it demonstrates that, even in the presence of but few signs and symptoms, if the condition is borne in mind, the diagnosis may be suspected and the procedures necessary for confirmation properly indicated.

CASE REPORT

History (H. N. 364666). The patient, a female aged 54, entered the Mount Sinai Hospital on April 9, 1934. One sibling was said to have died at the age of 55 of "carcinoma of the mouth." In the past she had undergone several operations: for a breast abscess, for disease of the gall-bladder, for a fistula in ano, and for some obscure pelvic disorder. Within the past year she had on three occasions developed a purulent otitis media of the right ear, requiring paracentesis of the drum each time.

The present illness set in about six months ago, when the patient began to suffer from severe headaches, usually occipital, but occasionally frontal in site. The headaches occurred almost every night and persisted up to the time of admission. Four months ago the patient experienced peculiar sensations over the right side of her mouth, which she described "as though there were hair sticking there." These paresthesias also persisted up to the time of admission. About three months ago the right side of her face felt frozen and numb, and sharp shooting pains occurred in the same region. For the past six weeks a burning sensation over the right side of the tongue and lips had been present. Also, for about the same period, she suffered from nasal obstruction and a purulent nasal discharge.

Examination. The general physical examination disclosed the scars of previous operations, and the absence of landmarks in the right ear drum. Of particular significance were the presence of several massive, hard, freely movable lymph nodes on both sides of the neck and the enlargement of the axillary nodes.

The neurological status showed a Horner syndrome on the right with miosis of the pupil, enophthalmos and a ptosis. In the distribution of the right trigeminal nerve sensation of pain, touch, and temperature was impaired, being diminished over the first branch and absent over the second and third. The corneal reflex was absent on the right side. Hearing tests

showed a conduction type of deafness in the right ear due to the pre-existent disease of that organ.

Course. With the possibility of a Schmincke tumor in mind, special attention was directed toward the nasopharynx and justifiably so. On palpation there appeared a questionable degree of bulging of the posterior pharyngeal wall. Visual examination disclosed a mass in the nasopharynx, more on the right side, about the size of a pea, flat, purplish and with a superficial erosion. A biopsy of the area was made and the specimen reported as showing an "embryonal carcinoma (Schmincke type)." X-ray examination of the skull failed to disclose any evidence of erosion of the sella turcica or of the sphenoid sinus. Iodized oil injected into the sphenoid sinus made apparent an irregular filling of the sinus.

Radiotherapy was instituted promptly after the diagnosis of Schmincke tumor had been established. When the patient was observed some six weeks later, the cervical glands had diminished appreciably in size; the neurologic signs were unchanged.

COMMENT

Since attention was directed to the Schmincke type of tumor, numerous contributions dealing with the subject have appeared. A brief resumé of the salient features follows: Schmincke tumors originate from the epithelium overlying the lymphoid structures of the nasopharynx. They tend to occur at the lateral aspect of the pharynx—hence the prominence of auditory disturbances secondary to occlusion of the Eustachian tube in the symptomatology of the affection. A noteworthy characteristic of the tumor, and one which is stressed by most writers, is the fact that they do not tend to expand very liberally into the nasopharyngeal cavity. A tumor which has eroded the base of the skull and involved a number of cranial nerves, or one which has metastasized to the cervical lymph nodes may, locally, be so small as to escape detection unless special precaution is exercised. For this reason, and as a corollary, local symptoms are the exception in the syndrome. Unless, therefore, one is familiar with the distant effects of the growth, one may fail to investigate the original source of the disorder and to order appropriate therapy. As the tumor grows upward through the base of the skull, it pushes the dura before it rather than invades it. Any and all of the cranial nerves may be involved. The facial and auditory nerves tend, relatively, to be spared, due most likely to the fact that their foramen of exit from the skull is more postero-superiorly placed. The glossopharyngeal, vagus and special accessory nerves are involved as they pass through the jugular foramen, the hypoglossal nerve as it passes through the condyloid foramen. The sympathetic pathway is not infrequently involved. In the present case whether this system was compromised in its course through the neck by pressure from the enlarged glands or whether the tumor by direct extension affected the para-tri-

geminal sympathetic accompanying the ophthalmic branch of the trigeminal is open to question. Metastases from the nasopharynx occur most commonly to the cervical glands, less frequently to the stomach, lungs, kidneys, spleen, and mesentery. The tumor may occur at any age.

Histologically, the tumor is composed of pale-staining epithelial cells with lymphocytic infiltrations—hence the name, lymphoepithelioma, which is applied to these growths. At times the cell type resembles more that of a transitional carcinoma. Indeed, as Ewing has pointed out, the group of lymphoepithelioma is not clearly defined, and it may occasionally be difficult to decide whether the tumor is a lymphoepithelioma, transitional cell carcinoma, or a lymphosarcoma.

CONCLUSION

In any condition in which there is evidence of involvement of the cranial nerves lying at the base of the brain, and especially in the presence of auditory disturbances and cervical gland enlargement, the region of the nasopharynx should be carefully investigated. In this way an existing Schmincke tumor may be promptly detected and proper therapy instituted.

REFERENCE

(1) New, Gordon B.: Syndrome of Malignment Tumors of the Nasopharynx. Report of 79 Cases. J. A. M. A., 79: 10, 1922.

ARTERIOVENOUS FISTULA

A Case Report with a Discussion of the Related Circulatory Dynamics

WILLIAM M. HITZIG, M.D., and ARTHUR M. MASTER, M.D.

[*From the Surgical Service of Dr. Harold Neuhof and the Cardiovascular Laboratory*]

The clinical and experimental investigations of Leriche (1), Reid (2), Callander (3), Lewis and Drury (4), Holman (5), Matas (6), Ellis and Weiss (7), Fick (8) and others have demonstrated that arteriovenous aneurysms not only establish local vascular phenomena, but frequently effect a profound change in the mechanics of the heart and systemic circulation. Notwithstanding this, ligation of the arteriovenous communication invariably restores the efficiency of the cardiovascular system. This is borne out by blood velocity studies in the case presented below in which a prolonged "arm to tongue" circulation time present before operation, returned to normal shortly after operation. This communication also deals with the circulatory measurements and clinical observations characteristically found in this condition, and attempts to correlate them with the various abnormalities in the circulatory dynamics.

CASE REPORT

History (H. C. 361611). A healthy thirty-four year old male was shot in the right knee during February 1931. After the limb had been immobilized in a cast for six weeks, the patient noted a pulsating "purring" swelling in the right popliteal region. A flexion-deformity of the right knee had also developed. Six months later an arthroplasty was attempted without success. He became conscious of "numb feelings" below the right knee. During the year prior to admission, he had been disturbed by a sense of precordial heaviness, by a forceful and rapid beating of his heart, and by periods of "heavy breathing," palpitations, and transient right ankle edema. These were aggravated during physical activity and whenever he walked against the wind. Nevertheless he continued to lead an active life, and for several months did strenuous work as a farm hand. "To improve his wind" he played two hours of handball daily for about six weeks. He entered the hospital on January 15, 1934 for investigation and treatment of his condition.

Physical examination. The patient walked with a limp. He had no dyspnea at rest. The cervical veins showed neither distention nor abnormal pulsations. On auscultation, the lungs appeared clear. The heart

was moderately enlarged to the left. The second pulmonic sound was louder than the second aortic sound. There was a harsh precordial systolic murmur heard with maximum intensity in the apical and pulmonic areas. The liver was not enlarged. A flexion-deformity of the right knee was present. The right leg appeared fuller and warmer than the left. The superficial veins near the knee were moderately tortuous, dilated, and tense but did not pulsate visibly. There was no edema of the ankles. The right popliteal fossa was diffusely full and contained an egg-sized collapsible swelling. A continuous, loud, whirring machinery-like bruit and a continuous vibratory thrill, both extraordinarily intensified during systole, were present over the site of the purring expansile pulsation. These were transmitted upward into the femoral artery and downward into the vessels of the leg. Pressure on the right femoral artery caused a disappearance of the bruit, thrill, and aneurysmal pulsation. Although the pulsations of the dorsal pedal and posterior tibial arteries were not palpable, the warmth and the appearance of the right leg disproved the presence of circulatory impairment in the limb. There were no objective neurological signs. Pressure on the right femoral artery or on the popliteal fossa sufficient to obliterate the thrill resulted repeatedly in prompt slowing of the pulse, elevation of the diastolic pressure, disappearance of the precordial discomfort, and abolition of the precordial systolic murmur.

Course. The diagnosis of traumatic arteriovenous aneurysm of the popliteal artery was made, and on January 23, 1934 an obliterative endoaneurysmorrhaphy was performed by Dr. Neuhof. The popliteal vein which formed a sac two inches long and two inches deep was severed and ligated above and below the sac. The artery to the aneurysm, a branch of the popliteal artery, was ligated. The sciatic artery was dilated. Since only a branch of the main arterial trunk was involved, the aneurysm was obliterated without sacrificing the popliteal artery.

The patient had an uneventful convalescence. The day following operation his subjective symptoms were gone. The arterial pulsations below the right knee returned permanently after operation. There was no evidence of recurrence of the aneurysm prior to discharge or six months later.

In table 1, circulatory measurements and certain clinical data are presented. The arterial pressures were obtained with a sphygmomanometer. The venous pressure was determined by a slight modification (9) of the direct method of Taylor, Thomas, and Schleiter (10). The circulation times with saccharin and ether were measured by the methods of Fishberg, Hitzig and King (11), and Hitzig (12), respectively.

DISCUSSION

Direct communications between arteries and veins are either of congenital or acquired origin. Both types produce local circulatory disturbances, but the profound systemic effects which are commonly encountered

in the acquired variety are rarely associated with the congenital type. Though the local manifestations are not without significance, the systemic phenomena usually dominate the picture in cases of acquired fistula. It is only within recent years that myocardial insufficiency has been associated with these seemingly harmless, pulsating, vascular tumors of extremities.

I. Local circulatory phenomena. The regional manifestations at the site of the aneurysm vary with the calibre of the vessel involved, the size of

TABLE 1

Circulatory measurements and clinical observations

		ARTERIAL PRESSURE		PULSE RATE	CIRCULATION TIME		VENOUS PRESSURE		CIRCULATORY SYMPTOMS
		Left arm	Left knee		Saccharin	Ether	Arm	Right leg	
Preoperative observations									
		mm. Hg	*mm.* Hg		*sec.*	*sec.*	*cm.*	*cm.*	
1–20–34	A	120/50	170/90	78	32		4		Forceful beating of heart. "Weight" over heart. Precordial murmur
	A′	120/80		56	25				Disappearance of symptoms
1–23–34	B	122/54	148/90	78	28		$4\frac{1}{2}$	18	As above (A)
	B′	126/80	150/110	58			$4\frac{1}{2}$		As above (A′)
Operation 1–23–34									
Postoperative observations									
1–23–34*		130/78		82	$13\frac{1}{2}$	$6\frac{1}{2}$	5		No symptoms
1–31–34		130/80		72	12	6	$5\frac{1}{2}$		No symptoms
6– 8–34		136/86		74	14	6	$5\frac{1}{2}$		No symptoms
8– 3–34		132/90	200/140	72					No symptoms

A and B are observations before and A′ and B′ are observations after compression of popliteal fossa with sphygomanometer at 200 mm. Hg pressure.

* Twenty hours postoperatively.

the communication, and the volume and pressure of the shunted blood. The circulatory derangement in our patient manifested itself locally by a systolic-diastolic thrill and bruit, a high venous pressure in the leg, impalpable arterial pulsations below the knee, altered oscillometric measurements above and below the knee, and an elevated local skin temperature.

(*a*) *Systolic-diastolic bruit and thrill.* The continuous bruit and thrill, accentuated during systole and transmitted along the line of the vessels,

were classical in character. It is obvious why the continuous forceful diversion of blood from an area of high pressure (artery) to an area of low pressure (vein) produces at the site of the narrow communication, adventitious auscultatory and vibratory phenomena which are of an intensity inversely proportional to the diameter of the fistula and of a character continuous and synchronous with the forcible cardiac systole and with the elastic arterial recoil during diastole.

(*b*) *Venous pressure.* The veins of the right leg were engorged with blood which was pouring into them continuously under a comparatively high (arterial) pressure. The venous pressure in a large superficial vein about 10 cm. below the knee was 18 cm. of blood. The local increase in the cross-section of the venous bed due to an admixture of arterial and venous blood explains the slight enlargement of the limb, its increased warmth, and the transient recurring ankle edema. The venous pressure in the left leg could not be determined, but the veins appeared normally compressible and small in size. At the time of the patient's discharge, as well as six months later, the right leg and its superficial veins appeared approximately normal.

(*c*) *Arterial pulsations.* The pulsations of the right femoral artery were fuller and stronger than those of the left, but those of the right posterior tibial and dorsal pedal arteries could not be palpated prior to operation. Apparently the amount of blood which was short-circuited through the popliteal leak was sufficient to reduce the pulse pressure in the right leg to a minimum. The pulses were fully restored immediately following surgical obliteration of the fistula. These observations are significant since they serve as an index of the volume of blood which was diverted.

The reappearance of pulses distal to the aneurysm has also been reported in cases in which the main arterial trunk was either ligated or excised during operation. Reid (13) attributes this phenomenon to the extensive collateral circulation which usually develops in arteriovenous fistula.

(*d*) *Oscillometric observations.* A comparison of the oscillometric readings reveals the presence of high and low deflections above and below the aneurysm respectively. The heightened amplitude of the right femoral pulsation was probably due to the more elevated pulse pressure immediately above the aneurysm (unmeasurable because of the continuous bruit) and to the increased amount of blood coursing through that segment of the circulation. This dynamic dilatation of the artery proximal to the site of decreased peripheral resistance adequately explains the elevated oscillometric deflections. Actual anatomic dilatation of the supra-aneurysmal portions of arteries has been recorded by Hunter (14), Broca (15), Osler (16), Halsted (17), Reid (13) and others and probably represents a later or atrophic stage of the earlier dynamic state. Histologically, segments of these arteries have shown thinning of the walls and particularly atrophy of the elastica. In such cases also, probably because of relative disuse,

the arteries below the aneurysm have frequently been found contracted and smaller than normal. Fishberg (18) suggests that since the arterial leak may create a venous pulse in the involved extremity, the wide oscillometric excursion proximal to the aneurysm may really represent a summation of the combined arterial and venous pulsations. This concept would also explain the reading below the aneurysm which although lower than in the opposite limb appears nevertheless to be relatively too high in the presence of impalpable arterial pulsations.

(*e*) *Skin temperatures.* The impression of increased warmth of the skin

TABLE 2

*Oscillometric measurements**

	ARM	THIGH	LEG
Left	6	6	8.5
Right	5	20++	5

* Measurements carried out by Dr. S. Silverstone.

TABLE 3

*Skin temperatures**

LOCATION	SKIN TEMPERATURE READINGS IN DEGREES CENTIGRADE	
	Right	Left
Abdomen (lower)	34.0	34.0
Mid-thigh	34.0	34.0
Knee (over patellum)	34.0	32.0
Knee (popliteal fossa)	35.0	34.0
Mid leg (anterior)	34.0	33.0
Mid leg (posterior)	33.0	33.0
Ankle (anterior)	33.0	33.0
Ankle (posterior)	32.0	32.0
Foot (dorsum)	33.0	33.0
Foot (sole)	32.0	32.0

* Measurements carried out by Dr. A. Penner.

in the region of the aneurysm was corroborated by observations made with a thermo-couple (dermatherm). As shown in table 3, higher temperatures were obtained on the right side in the region of the patella, the popliteal fossa, and the upper anterior half of the leg.

II. General (systemic) phenomena. According to Matas (6), the effect of the fistula upon the systemic circulation is determined by seven factors. These are: (*a*) the size of the fistula; (*b*) the volume and force of the arterial stream which is short-circuited; (*c*) the calibre of the vessels involved; (*d*) the duration of the lesion; (*e*) the distance of the fistula from the heart; (*f*)

the age of the patient; (*g*) the presence or absence of co-existent cardiovascular disease. To these may be added an additional factor, the activity of the patient while suffering from the arteriovenous aneurysm. The first four factors of Matas and the one just mentioned in direct proportion to their magnitude and the fifth factor of Matas in inverse proportion to its magnitude may markedly alter the circulatory dynamics through the following two mechanisms: (*a*) by lowering the peripheral resistance and thereby lowering the diastolic pressure and (*b*) by increasing the venous return to the heart and thereby increasing the cardiac output. The last two factors of Matas are of obvious import as a contributory background. In the case we are presenting, these mechanisms played an important rôle in the pathogenesis of the abnormal cardiovascular symptoms and circulatory measurements.

The site of origin of the increased venous return is obviously the arteriovenous shunt, but the site of the reduced peripheral resistance has occasioned some speculation. Stewart (19) advanced the idea of reflex lowering of the peripheral resistance as a cause for the peripheral phenomena in aortic insufficiency. Clinically, Gallavardin (1) and Lewis and Drury found a close parallelism between the haemodynamics of arteriovenous aneurysm and aortic insufficiency. The persistence of capillary pulsation during compression of the aneurysm, despite the disappearance of the other circulatory phenomena, suggested to Lewis (20) that vasodilatation must accompany arteriovenous aneurysm as it probably does aortic regurgitation. Ellis and Weiss also considered generalized arteriolar dilatation as a possible cause for the reduced peripheral resistance in arteriovenous fistula. This view was borne out particularly in one of their patients in whom the low diastolic pressure persisted unchanged following both temporary and operative suppression of the aneurysm. However, opposing this concept are two fundamental observations, namely, (*a*) the inverse relationship that exists between the degree of lowering of the peripheral resistance and the size of the communication and (*b*) the rise in the diastolic pressure that occurs following exclusion of the fistula. Both of these strongly suggest that the decreased peripheral resistance originates primarily in the defect proper.

The genesis of myocardial insufficiency requires no special discussion. The question arises, however, which chamber of the heart is first to fatigue under the excessive myocardial strain and the relative myocardial ischemia. The work of the heart in maintaining the circulation is determined by the volume of blood it has to propel (venous return) and the resistance (pulmonary and systemic) against which its venous load is ejected. It is certain that the work done by the heart in arteriovenous fistula is augmented by the increased venous return, regardless of the influence of the decreased peripheral resistance and mean arterial pressure. Consequently, even in the early stages of this condition, the heart may hypertrophy (and

even dilate) as a physiologic response to increased work. This work-hypertrophy is mentioned in the literature by Matas, Holman, Gage and Herrmann (21) and others. The interval during which the heart copes adequately with the increased work confronting it represents the compensated phase of arteriovenous fistula.

The decompensated phase manifests itself when the work required of the heart exceeds its functional capacity. The heart dilates and symptoms and signs of myocardial insufficiency supervene. Heart failure in arteriovenous fistula is probably a summation effect of (*a*) mechanical overwork and (*b*) diminished coronary flow. The latter is particularly important in the light of the work of Anrep and his associates (22) who have shown that the coronary circulation is dependent on an adequate diastolic pressure, its flow being chiefly diastolic in time. To maintain its nutrition, the progressively enlarging myocardial mass requires a corresponding increase in its blood supply. The coronary circulation, however, is probably maintained at a constant and relatively diminished level by the low diastolic pressure. This results in relative ischemia of the hypertrophying myocardium, which must eventually lead to impairment of its nutrition and to diminution of its functional capacity. The left ventricle, being primarily and predominantly affected because of its greater bulk and more vigorous activity, is probably first to fail. The increased tension of the pulmonary circuit which results from the left ventricular insufficiency adds to the work of the right heart and subsequently also leads to its failure.

(*a*) *Circulation time.* Circulation times were determined by the saccharin method pre-operatively and postoperatively and by the ether method only postoperatively. The former measures the speed of the circulation from the antecubital veins through the lungs to the capillaries of the tongue (normal "arm to tongue" time 9 to 16 seconds) while the latter determines only the velocity of blood flow from the antecubital veins to the pulmonary capillaries (normal "arm to lung" time $3\frac{1}{2}$ to 8 seconds). It is well known that in the presence of heart failure the circulation time may be considerably prolonged.

Isolated left heart failure, as described by Hitzig, King and Fishberg (23), usually manifests a delayed saccharin circulation time due to the pulmonary engorgement and a normal venous pressure because of the continued efficiency of the right ventricle. This was the disturbance in our patient whose circulation time on admission was 32 seconds. Another circulation time repeated a few minutes later, during manual obliteration of the aneurysm, was 25 seconds. The increased rate of blood flow during this procedure demonstrates clearly that the functional circulatory disturbance tends toward reversibility when the etiological (mechanical) factor is temporarily excluded from the systemic circuit. This point was even more emphatically proved following the permanent elimination of

the defect. The saccharin circulation time, measured 20 hours postoperatively, was normal, confirming the existence of left ventricular insufficiency before operation and emphasizing the rapid readjustment of the heart and circulation after operation. Ether circulation times performed only postoperatively showed normal values.

Ellis and Weiss measured the circulation time with histamine in a case of femoral arteriovenous fistula. Although classical peripheral phenomena were present, there was no pulmonary congestion and the circulation time was normal. The relatively brief duration of the condition as compared with our case, the presence of anemia which exerts an accelerating effect upon blood velocity and the diminished activity of the patient, who was confined to bed during the major portion of his illness, may account for the normal circulation time.

The factors which govern the velocity of blood flow in other cardiovascular disturbances, play identical rôles in arteriovenous fistula. During the early or compensated phase of arteriovenous fistula, the circulation time may be normal. This may be compared to the findings in compensated cases of aortic insufficiency where no strict parallelism exists between the extent of the peripheral phenomena and the retardation of pulmonary blood flow. Dynamic studies of one such case recently observed by us showed the following: the blood pressure was 140/0; the venous pressure was $4\frac{1}{2}$ cm. of blood; the ether circulation time was 4 seconds, and the saccharin circulation time was 15 seconds. This patient had marked enlargement of the heart, but the "arm to tongue" circulation time was within normal limits.

It is therefore conceivable that, in cases with small defects even of long duration or in early cases with large defects, the circulation time may not extend beyond normal limits. However, as in the case presented, when the work required of the left ventricle exceeds its functional capacity, the velocity of blood flow through the lungs may become retarded to a degree which parallels the exhaustion of the cardiac muscle and the degree of pulmonary engorgement.

(*b*) *Venous pressure.* Continuous direct measurements of the venous pressure were performed in our patient during and following compression and decompression of the fistula. Despite the retardation of pulmonary blood flow, the venous pressure during these procedures remained normal. Lewis and Drury (4) also failed to demonstrate any noticeable alteration in the height of the venous column when the fistula was opened and closed. Evidently when the fistula is opened, the normally functioning though enlarged right heart accommodates itself instantaneously to the increased venous return and consequently the systemic venous pressure fails to rise.

Despite the normal venous pressures reported by Lewis and Drury, Matas, and Ellis and Weiss, abnormal elevation of the venous pressure

may occur in later stages of arteriovenous fistula as a manifestation of right heart failure. This circulatory disturbance which results from exhaustion of the right ventricular myocardium probably owes its origin to the following two mechanisms, namely, (*a*) the increased venous return to the right heart, and (*b*) the superimposed and gradually increasing burden thrust upon the right ventricle by a progressively failing left ventricle (increased tension of the pulmonary circuit). That the venous pressure may be elevated in arteriovenous fistula was actually demonstrated manometrically by Cuneo (24). He gaged the venous pressure by a direct method and found it to be notably increased in one of his patients who presented signs of marked cardiac insufficiency.

The association of arteriovenous fistula and right ventricular failure as characterized clinically by distended jugular veins, swelling of the liver, ascites, peripheral edema, etc., is frequently found in the literature. In the earlier cases the pathologic physiology of arteriovenous aneurysm was not clearly understood and consequently its etiologic bearing upon co-existing cardiac decompensation was not properly evaluated. Osler observed two patients (one axillary and another femoral) for 15 to 19 years. They both died from "progressive failure of the circulation" at the early ages of 29 and 46 without the aneurysms being recognized as the cause. Hoover and Beams (25) observed a patient whose recurring chylous ascites had been tapped forty times before he was completely cured by operation. Reid had similar experience with his patient in whom the presence of general anasarca had led to the earlier diagnosis of cirrhosis of the liver and to repeated abdominal tappings.

The prompt disappearance of the manifestations of right heart failure following suppression of the aneurysm has been noted by several investigators. Leriche's patient who was conscious during the operation lost his dyspnea promptly upon the application of the clamp to the aneurysm, and his liver, which was previously enormously enlarged, became markedly reduced in size at the end of the operation. Similarly, Hoover and Beams noted disappearance of the distended pulsating jugular veins and marked reduction in the size of the liver directly following temporary compression or operative ligation of the defect. Reid observed in his case of recurring ascites that in addition to the above, there was a prompt subsidence of cyanosis, beginning diuresis and a decrease in heart size after operation. Evidently closure of the fistula, by reducing the venous return to within the functional limits of the dilated, over-worked right heart promptly restores its circulatory efficiency to such a degree that the general venous pressure falls, and the clinical manifestations of right heart failure disappear.

Hoover and Beams believe that the venous stasis in their cases arose from a functional disturbance of the right ventricle which was unassociated with co-existing left ventricular incompetence. They base their

view upon the absence of pulmonary stasis and rigidity. Although their findings may indicate that the functional capacity of the left ventricle was restored, they do not prove that there had been no antecedent left heart failure with pulmonary engorgement. From a functional standpoint, the right heart may be regarded as a valve for the left side of the heart. Consequently, with the advent of right heart failure, the pulmonary congestion associated with the preexisting left heart failure may be considerably lessened, a fact which has been logically propounded by Fishberg (26) as an explanation for the amelioration or relief of orthopnea in certain cases of left ventricular failure. It appears logical that when a failing right heart pumps a diminished volume of blood into the lungs, the left heart would be proportionately relieved from the strain of a previously excessive venous load. As a consequence, it is conceivable that the functional capacity of the left ventricle might become sufficiently restored to maintain adequately the reduced pulmonary blood flow.

To recapitulate, in arteriovenous fistula, symptoms of left ventricular failure with a normal venous pressure may long antedate the manifestations of right ventricular failure with an elevated venous pressure. High venous pressures may be encountered early, however, in communicating aneurysms between the aorta and either the superior vena cava or the pulmonary artery, but the mechanism in such conditions is obviously not comparable to that in similar communications between peripherally situated vessels.

(*c*) *Arterial pressure.* Although all of the peripheral phenomena observed by Lewis and Drury were not apparent in our case, the pre-operative arterial pressures did exhibit a lowered diastolic pressure, an elevation of the pulse pressure, and an abnormal difference in the arm-leg systolic pressures (Hill's sign). On compression of the aneurysm, the systolic pressure remained unaltered, but the diastolic and mean arterial pressures rose moderately. Following the operation and at subsequent examinations, there was a slight rise in the systolic pressure, a moderate rise in the diastolic pressure, and an exaggeration (6 months postoperatively) of the difference between the pressures in the arm and leg. The significance of the latter is not clear, although similar exaggeration of this phenomenon was obtained by Lewis and Drury following temporary exclusion of the aneurysm.

The lowered diastolic pressure which is a constant finding in arteriovenous aneurysm owes its origin to the relatively large peripheral outflow of arterial blood during diastole. Its rise following the temporary and permanent occlusion of the fistula suggests that the site for the lowering of the peripheral resistance in our patient resided predominantly, if not entirely, in the mechanical defect and in the quantity of blood short-circuited rather than in arteriolar dilatation.

(*d*) *Pulse rate.* The heart rate in arteriovenous fistula, which is labile,

is usually somewhat elevated even during slight exertion. Although the rate in our patient fluctuated between 88–92 after admission, it gradually slowed down in the hospital. After resting 3 days in bed, the rate varied between 78–84. At this time compression of the right popliteal fossa abruptly slowed the rate from 76 to 56 per minute. The pulse rate was not retarded on similarly compressing the left popliteal fossa. This striking bradycardia, as pointed out by Dean Lewis (27), was originally mentioned by Nicoladoni and subsequently emphasized by Branham (28). It serves as the most pathognomonic sign of arteriovenous fistula, and appears most prominently in those cases which manifest extensive involvement of the systemic circulation.

Considerable speculation exists as to its nature and origin. Lewis and Drury, and Ellis and Weiss state that the occurrence of the phenomenon following aneurysmal compression bears a definite relationship to the rise of the mean arterial pressure which initiates either a vagal reflex according to the former or a carotid sinus reflex according to the latter. Although Lewis and Drury were able to abolish the bradycardiac effect by atropinization, accepting, therefore, the vagal reflex idea, Weber (29) was unable to do so and Rieder (30) continued to obtain this phenomenon in dogs not only following atropinization, but even after section of the vagi. A local regulatory reflex residing within the aneurysm proper and having properties paralleling those of the carotid sinus has also been suggested by Ellis and Weiss.

On the other hand, Fishberg (18) believes that mechanical rather than nervous factors may play the determining rôle in the genesis of the bradycardia. He suggests that since the increased venous return through the arteriovenous shunt summons the heart to increase its output proportionately, compression of the aneurysm, by promptly diminishing this abnormal venous return, causes a corresponding reduction in the cardiac output. Inasmuch as the cardiac output depends upon two circulatory variables, namely, the stroke volume and the pulse rate, it is suggestive that the bradycardia may really represent a prompt regulatory response called forth to establish a balance between an acutely decreased venous return and a proportionately decreased cardiac output.

(*e*) *Blood volume.* Experimentally, Holman found an increased blood volume which he believed was a compensation for the diversion of blood through the arterial leak and the cause for the abnormal cardiovascular phenomena in arteriovenous fistula. His conclusions are not convincing however. His experiments show that the greatest increase in blood volume occurred in dogs with marked circulatory derangement. In one animal without any circulatory alteration the blood volume remained unchanged for five months. Ellis and Weiss reported a normal blood volume in their patient who presented no evidence of cardiac failure. Furthermore, the blood volume is known to be elevated in "congestive"

heart failure, and a moderate rise has also been observed by Fishberg, Hitzig, and King (9) in certain cases of coronary artery disease with left ventricular insufficiency. It appears, therefore, that in cases of arteriovenous fistula, uncomplicated by myocardial insufficiency, the blood volume may be normal, whereas, in decompensated cases it may be abnormally elevated. The rise is, therefore, probably compensatory for the heart failure rather than for the arteriovenous deviation. The blood volume was not determined in our patient.

(*f*) *Cardiac output.* The cardiac output was not measured because the foreign gas method is not applicable in arteriovenous aneurysm where the presence of the fistula introduces a secondary circulation (heart, artery, fistula, and vein circuit). Cardiac output determinations in such cases would naturally be too low since they would be a measure of the true cardiac output minus the volume of blood coursing through the defect.

The effect of arteriovenous fistula upon the cardiac output has occasioned considerable controversy. Lewis and Drury conclude that the cardiac output is not raised, maintaining that the blood diverted through the fistula is compensated by a decrease in blood flow through other areas. Similar experiments, however, by Harrison, Dock and Holman (31) indicate a rise in the cardiac output. By establishing fistulae of relatively large size, the latter group found that the cardiac output may even be doubled. Furthermore, by subsequently eliminating these communications, the cardiac output was reduced to about 48 per cent of that with the fistula open. According to Grollman (32) and others the cardiac output in arteriovenous fistulae may be considerably elevated.

The venous return, which is directly influenced by the size of the communication and by the quantity of blood diverted into venous channels, serves as the chief determining factor in the cardiac output. It is therefore apparent that in cases with large defects, the cardiac output may rise considerably, and that in cases with small defects where the local phenomena are slight and the systemic circulatory derangement is minimal, the true cardiac output may possibly remain within normal limits.

(*g*) *X-ray and fluoroscopic examination. Heart.* Preoperative teleoroentgenograms in our patient showed hypertrophy with moderate dilatation of both sides of the heart, and a wide transverse diameter which remained unchanged during compression of the aneurysm. The transverse diameter, originally measuring 15.3 cm., was definitely decreased one week after operation. Subsequent teleoroentgenograms taken at varying intervals showed a gradual return of the heart to normal size and contour and a progressive diminution of its transverse diameter to 13.0 cm. (figs. 1, 2, 3). Similar findings have been previously recorded.

Lewis and Drury, while studying the contours of the heart by means of an ortho-diagraph and a fluorescent screen, observed that although the left contour of the heart failed to show any appreciable change in its posi-

tion during aneurysmal compression, the right auricle did show some diminution in size. They attribute this change to the bradycardia, claiming that systole is more complete when the heart rate becomes slower. The reduction in the venous return following closure of the fistula, resulting thereby in diminished right auricular filling, may be a more plausible explanation.

Lungs. The pre-operative engorgement of the pulmonary vessels distinctly demonstrable roentgenographically, persisted unchanged during compression of the aneurysm. It disappeared, however, following opera-

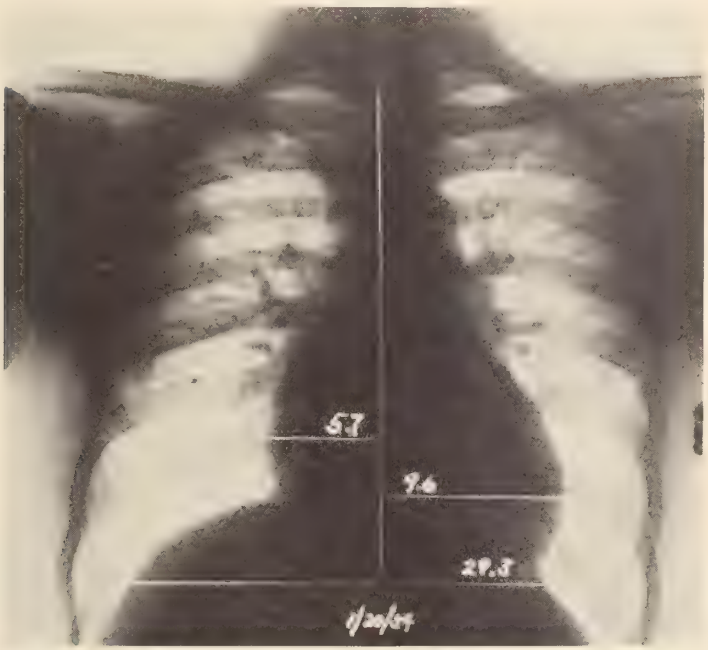


FIG. 1. Teleoroentgenogram taken on January 20, 1934 (3 days before operation) shows hypertrophy with moderate dilatation of both sides of heart, and marked pulmonary congestion. Transverse diameter of heart measures 15.3 cm.

tion. This roentgenologic observation made by Dr. Wessler is important because it may offer additional evidence, in the absence of an elevated venous pressure, of the functional impairment of the left ventricle.

(*h*) *Electrocardiograms.* The electrocardiogram has no characteristic pattern in arteriovenous fistula. In our case, on pressure over the aneurysm, the rate dropped from 75–80 beats per minute to the slow rate of 38 beats per minute (fig. 4). There was no ventricular preponderance nor evidence of myocardial involvement, in spite of the 3 years' strain on the heart. There was no change in the electrocardiogram after operation.

(*i*) *Precordial symptoms and murmur.* There was no history of pre-

existing heart disease in our patient. The precordial symptoms, present even at rest, were sequelae of the vascular lesion. Their disappearance during manual compression of the aneurysm may be attributed to the diminished venous return, the diminished pulse pressure, and the bradycardia, all of which contributed to the greater efficiency and decreased activity of the heart.

The origin of the precordial systolic murmur which also vanished during compression and stilling of the aneurysm is, however, not as clear. The question arises whether it is a "Makins" (33) (transmitted) or a "Stewart"

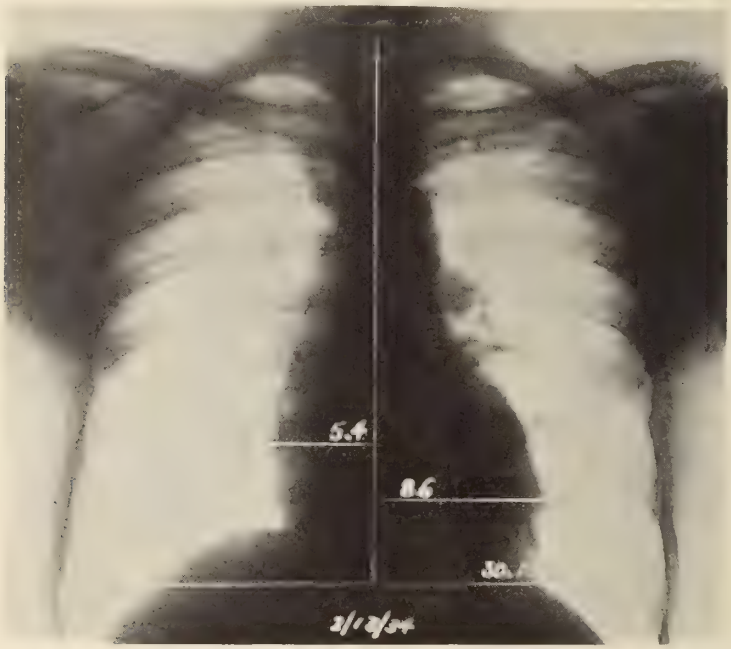


FIG. 2. Teleoroentgenogram taken on February 13, 1934 (3 weeks after operation) shows a return of the heart to normal size and contour, and a disappearance of the pulmonary congestion. Transverse diameter of heart measures 14.0 cm.

(34) (central) cardiac murmur. The former, for some unknown reason, occurs with greater frequency in vascular lesions of the lower extremities and represents a duplication of the systolic aneurysmal bruit. Although the mechanism of its transmission to the heart is not satisfactorily explained, it is probably conveyed through the blood stream (contiguous veins), since it is stilled even when the circulation through the fistula is only temporarily arrested. The "Stewart" murmur which is supposedly unaffected by manual compression of the aneurysm arises intrinsically from the relative valvular insufficiency which usually accompanies cardiac dilatation.

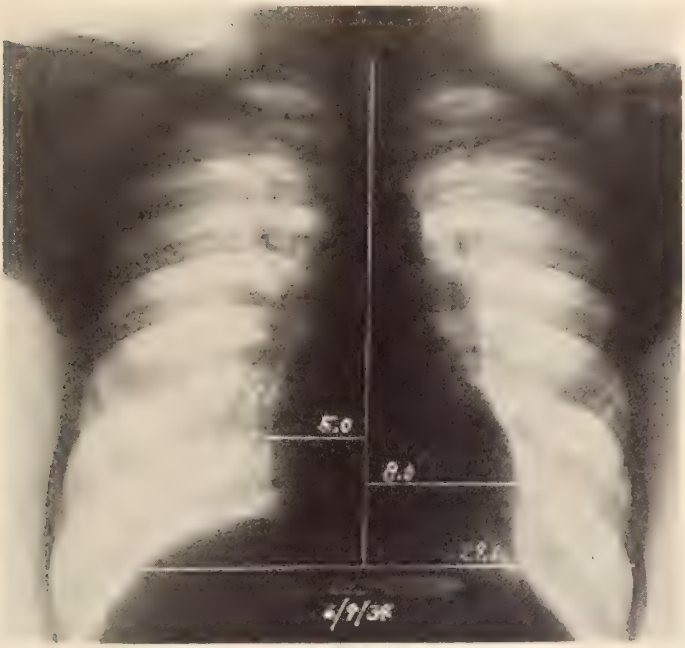


FIG. 3. Teleoroentgenogram taken on June 9, 1934 (5½ months after operation) shows normal heart and lungs. Transverse diameter of heart measures 13.0 cm

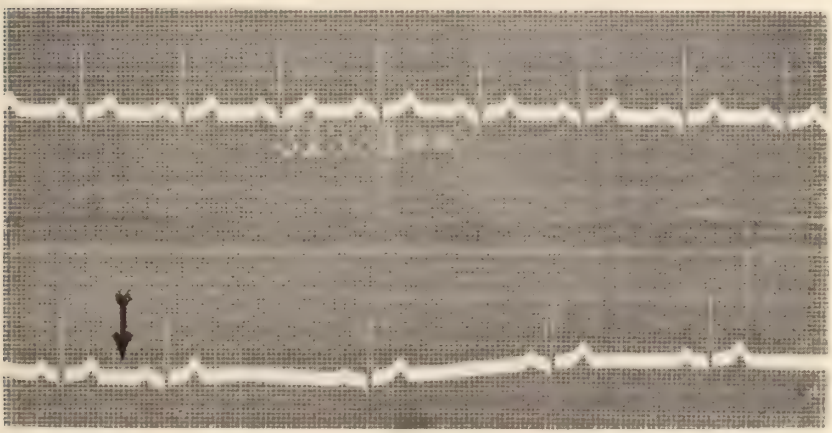


FIG. 4. Electrocardiogram. Continuous record of lead II. The arrow indicates point at which manual pressure was applied causing the bradycardiac phenomenon, with the most marked prolongation of the T-P interval in the initial beats.

Matas, like Stewart, is convinced that during digital compression, only the transmitted murmurs disappear. The central murmurs of cardiac dilatation persist, subsiding only after operation has removed the cardiac strain sufficiently to cause an actual reduction in the size of the heart. If such differentiation is feasible, then we must conclude that the systolic precordial murmur in our patient belongs to the transmitted type. This view is further favored in our patient by the roentgenographic demonstration of an unaltered cardiac shadow during aneurysmal compression.

COMMENT

The clearer understanding of the pathologic physiology of arteriovenous aneurysm has resulted in a wider recognition of the causal relationship of this local mechanical condition to the serious disturbances of the circulatory dynamics. In some of the earlier cases in which a co-existing aneurysm was suspected, the patients were often regarded as "bad risks" and were left to their fate. But since Leriche's successful operation in 1919 and Reid's work in 1920, operations for removal of the aneurysms have been widely advocated and have led to remarkable cures. Even the most "severely damaged hearts" have yielded to this therapeutic measure.

The severity of the existing cardiac insufficiency offers no contraindication to the operation, although it is important to ascertain the exact rôle of the aneurysm in the presenting circulatory derangement before resorting to surgery. It may sometimes be difficult to differentiate between aneurysm and intercurrent organic heart disease as the cause of the severe decompensation and marked cardiac enlargement. If that occurs and the aneurysm is situated in an accessible position, its etiologic importance may be established by determining the effect of manual compression upon the following circulatory criteria: (*a*) the arterial pressure; (*b*) the venous pressure (in the presence of right heart failure only); (*c*) the pulse rate; (*d*) the circulation time.

If during this maneuver, the arterial pressure rises (diastolic more than systolic), the elevated venous pressure (of right heart failure) falls, the pulse rate drops abruptly, and the retarded circulation time accelerates, one may safely conclude that the aneurysm plays an important part in the patient's circulatory derangement and should therefore be permanently eradicated. Because there is probably no measurable alteration of the venous pressure in the absence of right heart failure, the venous pressure effect cannot always be used as a guide in evaluating the relationship of the aneurysm to the existing circulatory disturbance. The indication for operation may, however, be determined solely on the basis of arterial pressure, heart rate and circulation time modifications alone. Additional guidance may be obtained by observing the effects of aneurysmal compres-

sion upon the patient's precordial discomfort, dyspnea, precordial murmurs and other clinical manifestations.

Since aneurysmal ligation will also lessen the work of a pathological heart and thereby improve its circulatory efficiency, this procedure is advocated even in the presence of organic heart disease.

SUMMARY

A case is reported of arteriovenous aneurysm of popliteal vessels of several years duration. There were the classical local and systemic phenomena characterizing arteriovenous fistula. The outstanding circulatory disturbance was left ventricular failure which manifested itself by dyspnea on exertion, a louder second pulmonic sound, enlargement of the heart, pulmonary congestion, and by a markedly prolonged saccharin circulation time. The normal venous pressure indicated an efficient right ventricle.

Following surgical obliteration of the fistula, the arterial pulsations below the aneurysm returned and the precordial discomfort and murmur disappeared. The normal saccharin circulation time obtained twenty-hours after operation demonstrated the strikingly rapid re-adjustment of the circulation following the removal of the etiologic (mechanical) factor. Roentgenograms taken at intervals after operation showed a disappearance of the pulmonary congestion and a progressive return of the cardiac silhouette to normal.

The mechanisms which operate in the derangement of the circulation in arteriovenous fistula are discussed.

BIBLIOGRAPHY

(1) Leriche, R.: Asystolie consecutive à l'evolution d'un anévrisme arterioveineux iliaque externe: Extirpation de l'anévrisme, Guérison de l'asystolie. (This includes Gallavardin's cardiologic report.) Lyon Chir., 16: 427, 1919.

(2) Reid, M. R.: The Effect of Arteriovenous Fistula Upon the Heart and Blood Vessels. An Experimental and Clinical Study. J. H. H. Bull., 31: 43, 1920.

(3) Callander, C. L.: Study of Arteriovenous Fistula with an Analysis of 447 Cases. J. H. H. Rep., 19: 260, 1920; Ann. Surg., 71: 428, 1920.

(4) Lewis, T. and Drury, A. N.: Observations Relating to Arteriovenous Aneurysm. Heart, 10: 301, 1923.

(5) Holman, E.: The Physiology of an Arteriovenous Fistula. Arch. Surg., 7: 64, 1923. Experimental Studies in Arteriovenous Fistulas. Arch. Surg., 9: 822, 1924. Arteriovenous Aneurysm. Ann. Surg., 80: 801, 1924.

(6) Matas, R.: On the Systemic or Cardiovascular Effects of Arteriovenous Fistulae. Internat. Clinics, 2: 58 (Series 35), 1925.

(7) Ellis, L. B. and Weiss, S.: The Local and Systemic Effects of Arteriovenous Fistula on the Circulation in Man. Am. H. J., 5: 635, 1930.

(8) Fick, W.: Kreislaufwirkung Arteriovenöser Aneurysmen. Deutsche Ztschft. f. Chir., 240: 113, 1933.

(9) Fishberg, A. M., Hitzig, W. M. and King, F. H.: Circulatory Dynamics in Myocardial Infarction. Arch. Int. Med., 54: 996, 1934.

(10) Taylor, F. A., Thomas, A. B., and Schleiter, H. G.: Direct Method for Estimation of Venous Blood Pressure. Proc. Soc. Exper. Biol. and Med., 27: 867, 1930.

(11) Fishberg, A. M., Hitzig, W. M., and King, F. H.: Measurement of Circulation Time with Saccharin. Proc. Soc. Exper. Biol. and Med., 30: 651, 1933.

(12) Hitzig, W. M.: Measurement of Circulation Time from Antecubital Veins to Pulmonary Capillaries. Proc. Soc. Exper. Biol. and Med., 31: 935, 1934.

(13) Reid, M. R.: A Report of Vascular Lesions. Am. J. Surg., 14: 28, 1931.

(14) Hunter, W.: The History of an Aneurysm of the Aorta with some Remarks on Aneurysms in General. Med. Observations and Inquiries, 1: 323, 1757. Further Observations Upon a Particular Species of Aneurysm. Ibid., 2: 390, 1762.

(15) Broca: Anévrysme arterioveineux du pli du coude. Énorme dilatation consecutive des arterès humérale, axillaire et sous-clavière; Rupture du sac. Amputation. Bull. et mém. Soc. de chir. de Par., 4: 392 (Series 2), 1864.

(16) Osler, W.: An Arteriovenous Aneurysm of the Axillary Vessels of Thirty-one Years' Duration. Lancet, 2: 1248, 1913. Remarks on Arteriovenous Aneurysm. Lancet, 1: 949, 1915.

(17) Halsted, W. H.: Congenital Arteriovenous and Lymphaticovenous Fistulae. Tr. Am. Surg. A., 37: 262, 1919.

(18) Fishberg, A. M.: (Personal Communication).

(19) Stewart, H. A.: Experimental and Clinical Investigations of the Pulse and Blood Pressure Changes in Aortic Insufficiency. Arch. Int. Med., 1: 102, 1908.

(20) Lewis, T.: The Blood Vessels of the Human Skin and their Responses. London, Shaw and Sons Publishers, 1927. P. 267.

(21) Gage, I. M. and Herrmann, G. R.: Cardiac Hypertrophy in Arteriovenous Aneurysm. Proc. Soc. Exper. Biol. and Med., 25: 767, 1928.

(22) Anrep, G. V., Davis, J. C., and Volhard, E.: The Effect of Pulse Pressure upon the Coronary Flow. J. Physiol., 73: 405, 1931.

(23) Hitzig, W. M., King, F. H., and Fishberg, A. M.: Circulation Times in Failure of the Left Side of the Heart. Arch. Int. Med., 55: 112, 1935.

(24) Cuneo, B.: Sept cas d'anévrismes arterioveineux des vaisseaux femoraux. Bull. et mém. Soc. de chir. de Par., 43: 1415, 1917.

(25) Hoover, C. F. and Beams, A. J.: Diagnosis and Pathologic Physiology of Arteriovenous Aneurysm. Arch. Int. Med., 33: 1, 1924.

(26) Fishberg, A. M.: On Orthopnea. Libman Anniv. Volumes, 1: 415, 1932.

(27) Lewis, D.: The Bradycardiac Reaction and the Cardiac Changes in Arteriovenous Aneurysms. Libman Anniv. Volumes, 2: 733, 1932.

(28) Branham, H. H.: Aneurysmal Varix of the Femoral Artery and Vein Following a Gunshot Wound. Internat. J. Surg., 3: 250, 1890.

(29) Weber, A.: Beobachtungen am Traumatischen Aneurysma Arteriovenosum. München med. Wchnschr., 64: 409, 1917.

(30) Rieder, W.: Herzschädigung Infolge Arterio-venösen Aneurysmas. Arch. f. klin. chir., 129: 597, 1926.

(31) Harrison, T. R., Dock, W., and Holman, E.: Experimental Studies in Arteriovenous Fistulae. Cardiac Output. Heart, 11: 337, 1924.

(32) Grollman, A.: The Cardiac Output of Man in Health and Disease. Baltimore, Charles C Thomas Publisher, 1932, p. 213.

(33) Makins, G. H.: Gunshot Injuries to the Blood Vessels. London, John Wright and Sons, Publishers, 1919, p. 54.

(34) Stewart, F. T.: (Quoted by Matas, R. See reference 6, p. 86).

ABSTRACTS

Authors' Abstracts of Papers Published Elsewhere by Members of The Mount Sinai Hospital Staff

A Plaster-of-Paris Buttress for Use in Cases of Fracture of the Humerus Treated by Means of Traction in a Thomas Splint. Joseph B. Stenbuck. J. Bone & Joint Surg. 15: 1015, October 1933.

The Thomas splint, with traction by means of a Spanish windlass mechanism, affords a simple, efficient, and economical method of treatment for fracture of the humerus. There is occasionally, however, the disadvantage of excessive localized pressure against the chest wall with accompanying pain and skin necrosis. This disadvantage may be overcome by the application of a plaster-of-Paris buttress (which is a modified jacket) allowing for the diffuse distribution of the pressure of the ring of the Thomas splint and the resultant relief of pain.

Colonic Stasis in Chronic Arthritis. S. Fineman, R. G. Snyder, C. H. Traeger, and C. A. Zoll. Arch. Phys. Therapy 14: 610, October 1933.

Intestinal stasis, with the probable absorption of intestinal toxic products, must be taken into consideration in the therapy of chronic arthritis. Roentgenologic studies of the colon show that a history of normal bowel habits is an unreliable guide in ruling out intestinal stasis. Colonic irrigations in the presence of stasis are indicated. Five year roentgenologic follow-up studies of the colon have not revealed any harmful after-effects from the colonic irrigations.

Right Ventricular Preponderance (Right Axis Deviation) of the Heart. The Significance of Ventricular Preponderance and T-Wave Inversion in the Human Electrocardiogram. Arthur M. Master. Am. J. M. Sc. 5: 186, 714, November 1933.

Left ventricular preponderance with inversion of T 1 is characteristic of left ventricular enlargement, and right ventricular preponderance with inversion of T in Lead III or Leads II and III is characteristic of right ventricular enlargement. The position, size and shape of one ventricle with respect to the other has a decided effect on the type of the electrocardiogram. Right ventricular preponderance and auricular fibrillation indicates that mitral stenosis is probably present.

Basal Metabolism in Asthma and in Epilepsy. Anne Topper and Hannah Mulier. Am. J. Dis. Child. 49: 963, November 1933.

The basal metabolic rate of children suffering from asthma or from epilepsy, although normal, tends to be lowered. The lowered rate should not be considered as an indication for the use of thyroid therapy. It may perhaps be explained on the basis of a reduced amount of thyroxine in the tissues due to excessive demands made on the thyroid gland during the spasmodic upheavals which occur periodically in these two conditions and, therefore, is an effect rather than a cause of epilepsy and asthma.

Members of the hospital staff and the out-patient department of The Mount Sinai Hospital are invited to submit for publication in this column brief abstracts of their articles appearing in other journals.

INDEX OF VOLUME ONE

The star (*) preceding the page number indicates an original article; the letters "ab" similarly placed indicate an abstract. Author entries are made only for original articles. Obituaries are indexed under this heading in alphabetical order under the letter "O."

ABDOMINAL, diagnosis of acute intra-abdominal lesions, *95
Abscess, amoebic, of liver, *73
 dissecting epidural, *13
 lung, aspiration, *232
 miliary, of kidney, *223
 subphrenic, secondary, *125
Amyloid goiter, *117
Anemias, reclassification, ab104
Anesthesia, local, anniversary, *195
Aneurysm, traumatic, of abdominal aorta, *227
Anginal syndrome, in anoxemia, ab192
Antiseptics, biliary, ab193
Arachnoiditis, adhesive spinal, *84
Arnheim, E. E., diagnosis of acute intra-abdominal lesion, *95
Arteriosclerosis, transient, *11
Arteriovenous fistula, *269
Arthritis, meningococcus, *23
 colonic stasis in, ab287
Asthma, basal metabolism in, ab287
Averbuck, S. H., traumatic aneurysm of abdominal aorta, *227

BACTERIAL endocarditis, ab72
 Basal metabolic rate in coronary artery thrombosis, *263
Beck, D., subphrenic abscess secondary to unrecognized perforation of gall-bladder, *125
 transient bilateral abductor paralysis in coronary artery thrombosis, *216
Bendick, A. J., roentgen diagnosis of tubal pregnancy, *135
Berck, M., radiotherapy for bronchorrhea in bronchiectasis, *98
Beres, D., ichthyosis vulgaris, *181
Bernstein, S. S., cardiac arrhythmias in Graves' disease, *166
Bile-pigments, excretion of, in obstructive jaundice, ab102
Blastomycosis, rectal, *128
Bleeding, postmenopausal, ab142
Bronchiectasis, radiotherapy in, *98
Bronchopleural fistula, *208
Bronchorrhea, radiotherapy in, *98

CARDIAC arrhythmias in Graves' disease, *166
Cataract following thyroidectomy tetany, *8
Cerebral localization in cerebrovascular disease, ab242
Chest, penetrating stab wounds and bullet wounds of, ab143
Circulation time in conditions determined by use of sodium dehydrocholate, ab191
Cohen, I., hemangio-endothelioma of right parieto-occipital region, *158
"Collapse" operation, frontal sinusitis, *20
Collip, J. B., recent advances in physiology of anterior pituitary, *28
Colon, scirrhous lesions of, *89
Coronary, affection of coronary arteries, ab72
 anomalous origin of left circumflex coronary artery, ab191
 artery thrombosis, basal metabolic rate in, *263
 P-wave changes in acute coronary occlusion, ab103
 thrombosis with pericardial effusion, *177
Cystine content of human serum proteins, ab143

DACK, S., see Master, *263
 Distomiasis, hepatic, produced by fasciola hepatica, *246
Dodds, E. C., some observations on nitrophenols, *237
Duodenum, acute obstruction of, ab191

EDELMAN, L., benign hypernephroma of kidney, *251
Electrosurgery, ab103
Embolectomy, pulmonary, *234
Embolism of central retinal and ciliary arteries, ab106
Encephalo-myelo-radiculitis, *213
Endocarditis, gonococcal, ab191
Endometriosis, *197
Endometrium, viability of menstrual fragments, ab143
Enterococcus, subacute endocarditis, *80

Ependymitis, primary, *184
Epilepsy, basal metabolism in, ab287

FASCIOLA, hepatica producing hepatic distomiasis, *246
Fehling's solution and isomerism of tartaric acids, ab144
Fistula, bronchopleural, *208
Fracture, maggot treatment, *138
humerus, use of plaster-of-paris buttress, ab287
Frank, R. T., three "tumors" of presacral retroperitoneal space, *2

GALL-BLADDER and liver diseases, ab72
Gastritis and duodenitis in relation to ulcer, ab192
Geist, S. H., case of endometriosis with polypoid invasion of vagina, *197
Globus, J. H., primary ependymitis, *184
Goiter, amyloid, in generalized amyloidosis, *117
Goldberger, M. A., induced pneumoperitoneum for detection of abdominal metastasis, *256
Goldman, I. B., radical resection of frontal bone for osteomyelitis following acute sinusitis, *260
Graves' disease, cardiac arrhythmias in, *166
in childhood, *107
Growth, retarded, standards of basal metabolism of, ab105
Guma, mediastinal, *203

HEART, dilatation and hypertrophy in infants and young children, ab143
factors causing clinical jaundice in heart disease, ab145
right ventricular preponderance of, ab287
Hemangio-endothelioma of right parieto-occipital region, *158
Hematoma, chronic subdural, *131
Hitzig, W. M., arteriovenous fistula, *269
Hormone diagnosis of viability of pregnancy, ab106
Hydantoins, optically active as hypnotics, ab142
Hydrogen ion concentration of topical preparations in dermatology, ab192
Hypernephroma, benign, of kidney, *251
Hypoproteinemia, ab103

ICHTHYOSIS vulgaris, *181
Icterus, "secondary," *154
Iliac veins, excision of, 243

JAFFE, H. L., see Master, *263
coronary thrombosis with pericardial effusion, *177
meningococcus arthritis and meningitis, *23
Jejuno-ileitis, hypertrophic,—tuberculous or non-specific, *121

KAPLAN, A., chronic subdural hematoma, *131
Keschner, M., encephalo-myelo-radiculitis, *213
Kidney, benign hypernephroma, *251
miliary abscesses of, *223
King, F. H., mediastinal gumma with ulceration into trachea, *203
Klein, S. H., unrecognized bronchopleural fistula of eighteen years' duration, *208
Kleinfeld, L., frontal sinusitis—"collapse" operation, *20

LEUKEMIA, acute, *101
Lilienthal, H., pulmonary embolectomy, *234
Lipoids of spleen and liver in various types of lipoidosis, ab242
Lippmann, R. K., ununited infected fracture, maggot treatment, *138
Liver, amoebic abscess, *73
Lung, aspiration as cause of putrid lung abscess, *232
streptotrichotic suppuration, *147
Lycopodium granuloma, ab191

MASTER, A. M., arteriovenous fistula, *269
basal metabolic rate in patient with coronary artery thrombosis when on 800 calorie diet, *263
coronary thrombosis with pericardial effusion, *177
Measles, in newborn infants, ab145
roentgenographic studies of chests of children, ab144
Medulloblastomas, cerebellar, ab105
Meningitis, meningococcus arthritis and, *23
Meningo-myelo-radiculitis, *173
Messeloff, C. R., ichthyosis vulgaris, *181
Metabolism, elevated, effect on hearts of fowl, ab104
Moolten, S. E., streptotrichotic suppuration of lung following aspiration of foreign body, *147
Moschcowitz, E., pseudo- or transient arteriosclerosis, *11
Murmurs, systolic, in children, ab144

NEEDLES, W., Schmincke tumor, *266
Neuhof, H., excision of common external and internal iliac veins for suppurative thrombophlebitis, *243
Neurinoma, central, tuberous sclerosis, ab193
Neurodermitis, disseminated, *219
Neurosurgical department in hospital, ab102
Nirvanol sickness and chemical allergy, ab144
Nitrophenols, *237

OBITUARIES, Highman, Walter James, *140
Moschcowitz, Alexis Victor, *26
Ophthalmology, relation with neurology, [ab]193
Oppenheimer, G. D., rectal blastomycosis, *128
Ortiz, P. N., hepatic distomiasis produced by fasciola hepatica, *246
Osteomyelitis, radical resection of frontal bone following acute sinusitis, *260
of skull, [ab]104, [ab]145
Otani, S., acute leukemia, *101
Ottenberg, R., "secondary" acquired hemolytic icterus, *154
Ovary, tubular adenoma of, [ab]104

PARALYSIS, bilateral abductor, *216
Peck, S. M., disseminated neurodermitis, *219
Periarteritis nodosa in infancy, [ab]105
Photomicrography, photoelectric meter, [ab]144
Pituitary, physiology of, *28
Pneumocephalus and subarachnoid hemorrhage, [ab]145
Pneumoperitoneum, induced, *256
Poll, D., thrombosis of pulmonary vessels in polycythaemia vera, *254
Preventive medicine, future rôle of, [ab]192
versus expectant treatment, [ab]142
Pulmonary embolectomy, need of organization, *234
Purpura annularis telangiectodes, [ab]193
Pyopneumothorax, infrapulmonary, *161

RADIOTHERAPY for bronchorrhea in bronchiectasis, *98
Rauh, L.W., dissecting epidural abscess in infant, *13
Roentgen diagnosis of tubal pregnancy, *135
Rosenthal, A. H., miliary abscesses of kidney, *223

SALMON, U. J., benign pelvic tumors associated with ascites and pleural effusion, *169
Schapiro, I. S., hypertrophic jejunoileitis—tuberculous or non-specific, *121
Schlivek, K., cataract following thyroidectomy tetany, *8
Schmincke tumor, *266
Schneider, D. E., acute infectious meningo-myelo-radiculitis, *173
Selinsky, H., adhesive spinal arachnoiditis, *84
Sinusitis, frontal—"collapse" operation, *20
radical resection of frontal bone for osteomyelitis following acute sinusitis, *260
Skin, full thickness skin graft, [ab]102
Spinal cord, fibroblastomas of, [ab]106
Stern, L., unusually clear evidence of aspiration as cause of putrid lung abscess, *232
Stomach, scirrhous lesions of, *89
Sugars, diffusion of, into yeast cell, [ab]242
Sussman, M. L., scirrhous lesions of stomach and colon, *89
Streptotrichotic suppuration of lung, *147
Sympathectomy, periarterial, in fractures, [ab]193

THEODORE, F. H., amyloid goiter in generalized amyloidosis, *117
Thrombo-angiitis obliterans, peripheral nerve section, [ab]144
Thrombosis, coronary with pericardial effusion, *177
primary jugular bulb, [ab]142
of pulmonary vessels in polycythaemia vera, *254
Thymus, transitional cell carcinoma of, *17
Tonsillectomy, effect on diphtheria, [ab]102
Topper, A., Graves' disease in childhood, *107
Touroff, A. S. W., infrapulmonary pyopneumothorax, *161
transitional cell carcinoma of thymus, *17
Transfusion of citrated blood, prevention of chills following, [ab]72
Tumors, affecting optic chiasm and optic tracts, [ab]104
benign pelvic, and ascites, *169
Schmincke, *266
of presacral retroperitoneal space, *2
Tyrosine and cystine content of serum proteins, [ab]143

ULCER, peptic, mechanism of pain in, [ab]193
new therapy of, [ab]105
traumatic, of duodenum and stomach, [ab]105

VAGINA, endometriosis with polypoid invasion of, *197
Venom, snake, sensitization and desensitization with, [ab]102
treatment of uterine bleeding with, [ab]106

WALLACH, K., subacute enterococcus endocarditis, *80
Wilensky, A. O., amoebic abscess of liver, *73
Wolff, J., fiftieth anniversary of beginning of local anesthesia, *195

VOLUME 2 MAY-JUNE, 1935 NUMBER 1

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

NON-TRAUMATIC PERFORATIONS OF THE UPPER URINARY TRACT

EDWIN BEER, M.D.

[*From the Second Surgical Service*]

Although it is well recognized that after injuries from without, perforation of the upper urinary tract may develop, it is not fully appreciated that occasionally, as a result of intrinsic disease, such perforations may take place and lead to more or less severe local suppuration, owing to the fact that communication is thus established between the lumen of the pelvis, calices or ureter and the extra-renal or extra-ureteral tissues. During recent years, since pyelography and ureterography have been regularly employed, it has been possible to discover these lesions more regularly, and the object of this paper is to put on record a number of such experiences. The accompanying illustrations show rather clearly the condition found in the pyelographic study of these cases.

CASE REPORTS

Case I. Uric acid stone in the lower calyx of the left kidney and in the lower left ureter. The patient had passed stones repeatedly, which proved to be uric acid. In the pyelo-ureterogram (fig. 1) the left kidney is found filled, moderately dilated and the calices blunted. Directly opposite the lowest calyx, there is an extravasation of the iodide into the tissues beyond the calyx. At operation, in a field corresponding to this area, there was found a small perinephritic abscess communicating with the calyx which was filled with uric acid stones.

Case II. The patient with bilateral polycystic kidneys was suffering from high temperature with an acute infection of the right kidney. The pyelo-ureterogram (fig. 2) shows a typical bizarre picture of a polycystic kidney, more or less dilated calices, and, opposite the upper pole of the right kidney, an extravasation of iodide into the perirenal tissues. At operation this area was exposed, and an abscess was discovered in the perinephric space communicating with the uppermost calyx.

Case III. The patient had had definite left lumbar pain and pyuria. Pyelogram (fig. 3) shows a most bizarre picture, with iodide running in all directions from the left pelvis, down along the ureter and through the



FIG. 1. Case I. R. B. Uric acid stones lowest calyx, perforation into perinephric tissue.



FIG. 2. Case II. V. S. Bilateral polycystic kidneys with infection and rupture of the upper calyx producing perinephric suppuration.



FIG. 3. Case III. M. R. Chronic renal suppuration with perinephric abscess communicating with the caliceal system.



FIG. 4. Case IV. I. J. Stone in lower pelvic ureter. Perforation at junction of pelvis of kidney and ureter.

cortex. At operation an old perinephric suppuration was found. It communicated through the cortex of an extensively inflamed kidney.

Case IV. The patient had pains in the left flank for four days. His temperature was high. The left kidney urine was turbid and contained pus. A roentgenogram showed a small stone in the lower left ureter; a pyelogram (fig. 4) showed perforation near the uretero-pelvic junction with extravasation of iodide in the lumbar gutter, both above and below the uretero-pelvic junction. The kidney having been drained by an indwelling catheter, the patient's temperature became normal, and the patient was free of pain.



FIG. 5. Case V. G. L. Rupture of ureter, probably at site of previous ureterolithotomy. Extensive extravasation of iodide into lumbar gutter.

Case V. The patient had been suffering from stones in the right kidney. Right lumbar uretero-lithotomy had been done in 1929. In 1931 some small concretions were seen in the lower pole of the right kidney, and the patient passed gravel and blood. As symptoms continued, the patient was re-admitted to the hospital. A uretero-pyelogram (fig. 5) showed extensive extravasation in the lumbar region, apparently communicating with the ureter. As symptoms did not abate, the patient was operated upon and a lumbar abscess was drained. No urinary leakage was encountered; the patient healed up without any untoward effect.

COMMENT

In three of the cases reported, stones were present which, with the superimposed infection, apparently led to the perforation. In the other two cases, stones could not be in any way blamed. In addition to these five cases, there have been several others showing the same or similar conditions.

In those cases in which the kidney function is still maintained, excretory urography may show the extravasation. However, owing to the fact that many of these cases have defective function and defective propulsive force, one should not expect to get satisfactory pictures by excretion urography, and a negative picture obtained by this method should not be regarded as conclusive evidence against perforation of the upper urinary tract.

LIPOID PNEUMONIA[1]

SAMUEL KARELITZ, M.D., AND BERNARD S. DENZER, M.D.

[*Service of Dr. Bela Schick*]

The presenting symptoms in this case were marasmus and upper respiratory infection. A single roentgenogram of the chest was not characteristic, and only a review of the history and the course of the disease confirmed the diagnosis of lipoid pneumonia. Probably a larger number of cases will be discovered now that reports are accumulating. This in turn may lead to a change of attitude in regard to the harmlessness of the common practice of nasal instillations in children.

CASE REPORT

History and course (H. N. 367373). The infant was born at full term; the delivery was normal. The birth weight was six pounds eleven ounces. She was weaned at one week of age and the weight fell to five pounds. Changes in formula were frequent and rather unsuccessful. She was first seen by one of us at four and one-half months of age; at that time she weighed only eight pounds and five ounces. The baby presented the poor turgor and other typical signs of mild marasmus; in addition, thrush was found on the buccal mucous membrane, and there was moderate general glandular enlargement. The Pirquet test was negative. Despite rational formulas the baby gained only three ounces in over two weeks. Then the child developed a mild degree of fever with a red throat and vague signs at the base of the right lung which were associated with signs of dehydration out of proportion to the apparent mildness of the infection. The baby was then referred to The Mount Sinai Hospital. On admission, the impression was that, in addition to marasmus, the baby was suffering from an upper respiratory infection and thrush and that it should be observed for the development of pneumonia. Although the child was sent to the hospital with a notation that a few râles were heard in the chest, there was no strong conviction that the lung was involved at all. X-ray examination, however, revealed a surprising picture—a diffuse shadow occupying the central part of both lung fields, a finding totally out of harmony with the clinical findings. (See accompanying figure.) Intradermal reactions up to 1 mgm. of tuberculin were negative. The combination of malnutrition, the extensive X-ray shadow with minimal pul-

[1] Presented on rounds of the hospital and at the meeting of the American Academy of Pediatrics, New York, October, 1934.

monary signs, suggested to one of us (S. K.) the possibility of lipoid pneumonia and further observation seemed to strengthen that diagnosis. The mother, on questioning, reported that for three months the child had been given a teaspoonful of mineral oil almost daily because of constipation and that the child coughed, struggled and vomited during its administration. Following the suggestion of Pinkerton the stomach washings were searched for fat containing mononuclear cells, but none



FIG. 1. Roentgenogram displaying a diffuse shadow occupying the central part of both lung fields (lipoid pneumonia).

were found. On looking over the child's record it was recalled that thrush was present. To exclude moniliasis the washings of the stomach were also examined for yeast, but none was found. For the first four days in the hospital the patient's temperature rose to 102.5°F. Thereafter for a period of four months it remained normal except for an occasional rise of one day's duration, probably due to intercurrent infection. The hemoglobin and red blood cell count were within normal limits. There was a leucocytosis of 18,000 to 24,000.

Three features marked the course of the disease: First, the relative constancy of the X-ray findings. Since June 12, the date of the first roentgenogram, there has been only a slight decrease in the extent and intensity of the shadow. Chronicity is characteristic of this condition and has been emphasized by Goodwin (1) and Pinkerton (2). Second, the persistent paucity of physical signs in the chest. From time to time a few râles, bronchovesicular breathing, or impaired resonance were noted. Of these only impaired resonance was found with any degree of constancy. In other words it is almost or quite impossible to make the diagnosis without the aid of the X-ray. Third, the nutritional state and its possible relation to lipoid pneumonia. This child had been malnourished and a feeding problem since birth. The malnutrition could not have antedated the administration of mineral oil for a long time, because the oil was given so early in life. There were many reasons why this child should have aspirated oil. First, fairly large quantities were given almost daily for months. Second, the child fought and vomited while the oil was being given. Third, the child's general debility may have depressed the cough reflex. Many of the cases reported by Goodwin and by Laughlen (3) occurred among weaklings, among those in coma or in convulsions and especially among children with cerebral injuries in whom the cough reflex was weak or absent. It is quite likely that in our case also the malnourished condition predisposed it to the aspiration of oil. On the other hand there is reason to believe that the lipoid pneumonia itself may be responsible for the persistence of the malnutrition. Even while the child was in the hospital under controlled conditions with an adequate diet, and even while she was free of infection and digestive disturbances, there was no gain in weight for two months. Only when insulin was given was there a slight increase in weight. Now, at the age of eight and one-half months she still weighs only ten pounds.

Why lipoid substance in the lungs should interfere with the nutritional state of the child is not clear. The hemoglobin and red blood cell count values being within normal limits and the absence of clubbing of fingers indicate adequate oxygenation. Nevertheless, that malnutrition is not merely adventitious is stressed by Goodwin, who writes: "Stunting of growth is so often associated with the active phase of lipoid cell pneumonia as to make one feel it to be part of the clinical picture."

The recognition of lipoid pneumonia is difficult. This is indicated by the fact that in only three of the twenty-five cases reported by Goodwin was the diagnosis made clinically. Reliance must be placed upon the X-ray findings. A single roentgenogram is not sufficiently characteristic to warrant the diagnosis of lipoid pneumonia. A series of films is more apt to provide a clue, for over a period of weeks or months there is either no clearing of the shadow or only a very slight improvement. Negative tuberculin tests and the persistent malnutrition represent confirmatory

evidences. The finding of fat-containing mononuclear cells in the stomach washings theoretically should prove helpful; however, in our case and in other reported proven cases no such cells were found. A history of the administration of oily substance to these children is significant in cases of suspected lipoid pneumonia. In some of the reported cases nose drops were given; in others, cod liver oil; in many, as in our case, mineral oil was given by mouth. On the other hand, in some cases reported by Pinkerton and Goodwin and Laughlen no foreign substance was either instilled into the nose or ingested. In these the fat or cream of the milk was responsible, and there was a history of feeding by gavage, of struggling during feeding, vomiting, coma, convulsions, paralysis, or some cerebral defect.

Pathology. The changes in the lung, as shown by Pinkerton (4), vary with the kind of oil which reaches the lung and the length of the period during which the oil was used. In the case of mineral oil, as shown by animal experimentation and in the human lung, the sequence of events is probably the following: The mineral oil reaches the alveoli in a finely subdivided state and is taken up by the large mononuclear phagocytes; some of these wander through the lymphatic channels to the bronchial glands. At times some of the lymphatics become plugged and rupture; giant cells surround the foreign material, and a tubercle-like mass is formed. Eventually connective tissue formation occurs, and very extensive fibrosis and atelectasis develop. Frequently, a true infectious pneumonia is superimposed; most authors emphasize the fact that infectious material is likely to be carried down from the nose and pharynx with the oil. The reactive pulmonary tissue is probably less resistant than normal to infection.

Among the other oils investigated by Pinkerton, olive oil, sesame oil and poppy seed oil were shown to be quite harmless. The lung tissue does not appear to be damaged in any way by the indefinitely continued presence of these oils in the alveoli. This is particularly significant because sesame oil and poppy seed oil are the principal components of iodipin and lipiodol, customarily used for intratracheal insufflation. Cod liver oil and milk fat caused moderate degrees of necrosis and fibrosis while lard oil produced these changes in more severe form. Chaulmoogra oil, although a vegetable oil, showed even more violent reactions than those of the lard oil. Pinkerton believes that the free fatty acid content of the oils is responsible for the tissue damage.

Prognosis. The outcome depends largely upon the associated symptoms and diseases. Even when no complicating factors exist, subsidence of infiltration in the lung covers a period of many months.

Treatment in our case consisted of radiotherapy to the chest and measures to improve the state of nutrition. The X-ray therapy apparently was of no avail. Effective treatment must rest primarily on prophylaxis.

The realization that even customary instillation of nasal drops and administration of oils by mouth may permit the aspiration of oil into the lungs, no doubt, will modify our procedures. Such measures or even usual feedings when met by resistance and associated with struggling and vomiting, or when the recipient patients are in coma or suffering from some cerebral defects, are more likely to result in such aspiration.

REFERENCES

(1) Goodwin, T. C.: Lipoid Cell Pneumonia. Am. J. Dis. Child., 48: 309, 1934.
(2) Pinkerton, H.: Oils and Fats: Their Entrance into and Fate in the Lungs of Infants and Children. Am. J. Dis. Child., 33: 259, 1927.
(3) Laughlen, G. F.: Pneumonia Following the Nasopharyngeal Injections of Oil. Am. J. Path., 1: 407, 1925.
(4) Pinkerton, H.: Reactions to Oils and Fats in Lungs. Arch. Path., 5: 380, 1928.

ACUTE LABYRINTHITIS WITH MENINGITIS SYMPATHICA. LABYRINTHECTOMY. RECOVERY

JACOB L. MAYBAUM, M.D.

[*Service of Dr. I. Friesner*]

Acute labyrinthitis is a relatively infrequent complication of acute or chronic suppurative otitis media. The pathways of infection are ordinarily through the oval or round window, through a fistulous tract in one of the semicircular canals or through the promontory. The condition presents several diagnostic difficulties and often raises a question as to operative interference. Early operation is advised by some surgeons; others are inclined to the view that a delay allows time for a protective meningeal reaction to take place diminishing the tendency toward a spreading meningitis.

CASE REPORT

History (H. N. 361788). The patient, five and one-half years old, was admitted to the otologic service with a history of spontaneously discharging left ear of seven weeks duration following an upper respiratory infection. There were no other symptoms referable to the ears during that period. Thirty-six hours before admission to the hospital, the patient became dizzy while walking, fell and complained that the room turned about her. She could not, however, determine the direction of the turning. The vertigo was still present when the patient entered the hospital. She had been vomiting persistently for twelve hours. For a day she had pain in and about the left ear and some pain in the abdomen.

Examination. The left ear showed a moderate, thin, purulent discharge through a perforation postero-inferiorly. The drum was fairly flat; no canal wall changes were present. *Noise apparatus placed in the right ear showed a total loss of hearing in the left.* There was a spontaneous nystagmus directed to the right. The temperature was 100°F.

Diagnosis. The history of middle ear discharge of seven weeks duration without spontaneous pain during that period, the onset of vertiginous symptoms during the last two days of diminishing severity, the total loss of hearing in the left ear, and the spontaneous nystagmus to the right, pointed to the diagnosis of acute labyrinthitis with an apparently uninvolved mastoid.

Course. During the first night in the hospital the patient became quite irritable, began to complain of earache and considerable frontal headache. Her temperature rose to 103.6°F. Nystagmus to the right became much

less marked. *There was no vestibular response on caloric stimulation of the left ear.* There developed a fairly rigid neck, but no Kernig or Brudzinski were elicited.

A lumbar puncture yielded 3 c.c. of cloudy cerebrospinal fluid, under normal pressure, containing 2,060 cells with polymorphonuclear neutrophiles 62 per cent, lymphocytes 38 per cent. There were no organisms on smear.

It was felt that the condition was mainly in the nature of a sympathetic or protective meningeal reaction secondary to a suppurative labyrinthine process and that because of the imminent danger of further advance of the meningeal process, immediate operative interference was indicated.

Operative procedure and findings. Radical mastoidectomy. Mallet and gouge were not used in order to avoid unnecessary concussion of the labyrinth with possible spread of infection to the meninges. The cortex was uncovered with a rongeur and the cells thoroughly exenterated. The mastoid was large, cellular, filled here and there with granulations but no free pus was found excepting a drop or two in the zygoma. The radical mastoidectomy was done in the usual manner, the semicircular canals brought to view, and the ossicles were then removed.

Labyrinthectomy. After removing the stapes, the oval and round windows were united (pyramid removed with small gouge). The horizontal canal, slightly behind the ampullated end, was uncapped and the post lip of this groove was enlarged, thus entering the vestibule. The anterior lip was not infringed upon in order to avoid injury to the facial nerve by accidently cracking the Fallopian canal. The superior semicircular canal was then opened. The postero-inferior aspect of the promontory (basal whorl of the cochlea) was then uncapped. Thin fluid was seen on opening the horizontal canal and granulations on uncapping the cochlea. Wound was left wide open; iodoform packing was used.

Postoperative course. Twenty-four hours following the operation, there appeared a striking change in the condition of the patient. The temperature returned to and remained normal. Headache and vertigo disappeared. The nystagmus gradually lessened and after a week was no longer present. The general condition continued to improve, and the patient was discharged one month after operation.

COMMENT

The problem which first presents itself in an acute labyrinthitis secondary to a suppurative otitis media is whether we are dealing with a serous or a suppurative process in the labyrinth. In the former, operative interference is contra-indicated, as recovery occurs without intervention. In the latter, only exceptionally does recovery take place, either a fatal meningitis or cerebellar abscess ensuing. Only in rare instances does a suppurative labyrinthitis heal spontaneously. In the early stages the

symptoms (nystagmus, vertigo, vomiting) are identical for both conditions. The symptoms of serous labyrinthitis, however, gradually subside and soon disappear. In suppurative labyrinthitis there is a progression of symptoms with evidence of beginning meningeal involvement as indicated by the occurrence of headache, temperature rise and increase in cell count of spinal fluid. In some instances there may occur a period of latency after a stormy onset of labyrinthine disturbance only to be followed by symptoms pointing to evidence of meningeal irritation. With the onset of symptoms of involvement of the meninges, operative interference is imperative.

PRIMARY AMYLOIDOSIS[1]

ELI MOSCHCOWITZ, M.D.

[*Service of Dr. B. S. Oppenheimer*]

Primary amyloidosis is a disease that will have to be considered in future nosology. Given a large liver and spleen combined with a proteinuria and hypercholesteremia, the possibility of primary amyloidosis must be considered, especially if no cause for this combination of signs can be advanced. The obscure nature of this disease has been somewhat clarified by the work of Kuzcynski (1) who found that he could experimentally obtain amyloidosis in mice, comparable in every way to that observed in human beings, by either overfeeding with casein or, even better, by the repeated injections of sodium caseinate (nutrose). This work has been confirmed by others (2, 3). Moreover, Jaffe obtained amyloidosis by injections of pure serum into animals. Amyloidosis is therefore today regarded as a chronic protein toxicosis. No attempt has been made thus far to explain primary amyloidosis in human beings on the basis of these observations.

CASE REPORT

History (H. N. 362029). A woman, aged 56 years, was admitted to the hospital January 28, 1934. One year previous to her admission she had noted red blotches on the right side of her neck. These lesions were evanescent. However, during the last six months the blotches appeared more frequently, became more extensive, and spread to the left side of the neck, lower eyelids and trunk. They were dark red, irregular in shape and were present for about two weeks. During the past two years she noticed blood on her handkerchief on blowing her nose. About three months ago while eating she noticed a blue blister beneath her tongue which burst and bled for half an hour. She estimated the quantity of blood lost as about a cupful. She began to bleed again from the mouth the day before admission. There was marked anorexia, and the patient had lost eleven pounds in the four month period previous to admission. She had attacks of precordial oppression and dyspnea on exertion. Palpitation was severe and frequent. She had had numbness of the fingers for the past two years, and for six months sensations of pins and needles in her fingers.

Examination. The patient was a thin, gray haired woman with cyanosis

[1] Presented before the clinical conference of The Mount Sinai Hospital, March 22, 1934.

of the lips. There were arteriosclerotic changes in the vessels of the fundi. The uvula was swollen and ecchymotic, and there were numerous groups of large petechiae on the buccal mucosa, some of which had white centers. The chest was emphysematous and the dorsal spine kyphotic. The lungs were clear. The heart was normal except for frequent extrasystoles. The blood pressure was 140 systolic and 80 diastolic. The liver edge was palpable to the umbilicus, and was unusually hard and firm. On the left side of the neck, on the eyelids, and in the right groin there were large purpuric spots. There was no lymphadenopathy.

Laboratory data. Hemoglobin, 80 per cent; red blood cells, 5,000,000; platelets, 230,000; white blood cells, 12,000; polymorphonuclear neutrophils, 44 per cent; lymphocytes, 54 per cent; monocytes 1 per cent and eosinophiles, 1 per cent. The tourniquet test was negative; the bromsulphthalein and galactose tolerance tests were normal. The urine on repeated examinations contained abundant albumin, a few white blood cells, hyaline casts, and on one occasion an amyloid cast. There was no Bence-Jones protein.

Roentgenologic studies of the gastro-intestinal tract failed to reveal any lesion. Roentgenograms of the chest showed only a hypertrophy of the left ventricle. Roentgenograms of the bones revealed no lesion. A Congo red test showed 100 per cent tissue absorption at the end of one hour, a finding pathognomonic of amyloidosis of the kidneys.

Course. In view of the fact that no other cause for the symptoms was ascertainable, the diagnosis of primary generalized amyloidosis was made. While in the hospital, she had repeated crops of cutaneous hemorrhages. On one occasion she had frank blood in the stool, and sigmoidoscopy revealed numerous petechial hemorrhages in the rectal and sigmoidal mucosa. The blood fibrinogen was 350 mg. The blood protein was 7.8 per cent of which 4 per cent was albumin and 3.8 per cent globulin. The cholesterol was between 500 and 560 mg. of which the ester fraction was between 340 and 375. The Van den Burgh reactions were normal. The blood Wassermann was negative. The sedimentation time was 23 minutes.

She was given liver extract intramuscularly, 2 c.c. twice a week. The patient left the hospital on March 7, 1934, and died three weeks later. Her private physician's diagnosis of the cause of death was "uremia."

COMMENT

The albuminuria of chronic amyloidosis is very likely due to amyloid infiltration of the kidney. Next to the spleen and liver it is the earliest organ to be affected. The albuminuria often results in the nephrotic syndrome with resulting hypoproteinemia, edema, etc. In our patient, despite the large loss of protein in the urine, there was no hypoproteinemia or edema, probably because the protein loss had not extended over a sufficient length of time. The hypercholesteremia, which is common in

amyloidosis, whether primary or secondary, has probably some relation to the hypoproteinemia, as in the nephrotic syndrome. Its precise relationship is unknown.

Hemorrhages in the skin and mucous membranes in amyloidosis have been reported by Leupold (4) and Königstein (5).

Therapeutically the outlook for the care of amyloidosis, whether primary or secondary, is not very promising. A reversal of the process has been reported when the amyloidosis was recognized early, and a suppurative focus was eliminated. In advanced cases nothing has proved effective thus far. Since some investigators (6) have found that in experimental amyloidosis there may be a regression of the process if powdered liver is added to the diet, some hope has been aroused that in human amyloidosis the administration of liver may be beneficial. Thus far, however, no reports are available as to the clinical effects of this form of therapy.

REFERENCES

(1) Kuczynski, M. H.: Edwin Goldmann Untersuchungen über cellulare Vorgänge, usw. Virchow's Arch. f. path. Anat., 239: 185, 1922.

(2) Jaffe, R. H.: Amyloidosis Produced by Injections of Proteins. Arch. Path., 1: 25, 1926.

(3) Smetana, H.: Experimental Study of Amyloid Formation. Bull. Johns Hopkins Hosp., 37: 383, 1925.

(4) Leupold, E.: Amyloid und Hyalin. Ergeb. d. Allg. Path. und. Path. Anat., etc., 21: 120, 1925.

(5) Konigstein: Handbuch der Dermatologie. Amyloid der Haut. 4: 254, 1932.

(6) Grayzel, H. G., Jacobi, M., Warshall, H. B., Bogin, M., and Bolker, H.: Production of Amyloid Bodies in Mice. Arch. Path., 17: 50, 1934.

AN UNUSUAL CASE OF XANTHOMA TUBEROSUM MULTIPLEX

HENRY SILVER, M.D.

[*Dermatological Service of Dr. I. Rosen*]

The question of etiology of xanthomas is still unsettled in spite of recent excellent contributions to the subject. More casuistic contributions are necessary to throw light on the complicated mechanism of formation of xanthomas. This case is worth recording because of the unusual clinical and laboratory findings.

CASE REPORT

History (H. N. 343117). An undersized, stocky woman, 55 years of age, born in Russia and residing in the United States for the past 25 years, was admitted to the hospital September 6, 1932. She gave birth to seven children, three of which are living and well, the other four died at birth (difficult forceps deliveries). Seven years ago she had an attack of acute rheumatic fever which persisted for about four weeks. There was no history of diabetes, gall-bladder or kidney disease. The family history was irrelevant.

Ten years ago there appeared an eruption, first on the hands and then elsewhere in rapid succession, until the eruption became generalized. In the last two years the process became somewhat stationary.

Examination of the skin. At the first glance one noticed the severe involvement of the face and neck. The face was actually studded with various-sized tumors. The lesions were elevated, ranging in size from that of a millet-seed to a hazelnut. Small and large lesions appeared side by side and in some areas there were conglomerations of tumors. The individual lesions were sharply defined, mostly round, movable, painless, had a smooth surface and were fairly firm to the touch, especially the older ones. The color was predominantly chamois yellow; a few of the lesions, however, had a reddish hue and some were skin colored.

The distribution of the lesions. Face and neck: The upper and lower eyelids, especially the inner cantus of the eyes were fully covered. Distinct minute yellowish papules were seen on both conjunctivae. One yellowish papule was found on the tip of the tongue; a group of lesions on the buccal mucosa (fig. 1). A linear arrangement was noticed along the nasolabial folds. The sides of the chin, front of the ears and upper lip were covered with small lesions (fig. 2). On the lateral aspects of the neck there was a large number of densely set lesions. A few pendulous, reddish-yellowish nodules were seen on the back of the neck.

Trunk: The lesions were seen mainly on the upper part of the chest and underneath the breast. On the abdomen and on the thighs there were a few dispersed individual lesions. On the back of the trunk, the upper part again, i.e., the shoulder region was mostly involved (fig. 3).

Upper extremities: The volar as well as extensor surfaces were covered with various-sized nodules. An isolated walnut-sized tumor appeared on the back of the left shoulder. On the upper part of the forearm more to the ulnar side was a conglomerated tumor, showing coalescence of three hazelnut-sized tumors. The elbow regions so commonly the site of this affection were free of lesions. The outer aspect of the cubital region was



Fig. 1. Lesions on the buccal mucosa.

occupied by a large tumor, livid-blue in color, doughy, lobulated, freely movable, resembling a lipoma and for that reason detailed. The dorsum of the right hand as well as the palm was completely free. The left hand showed a firm nodule on the wrist and another on the volar surface of the index finger on the site of the tendons. The trunk and lower extremities were similarly covered with various-sized nodules. There were numerous lesions on the scalp.

Laboratory data. The blood chemistry revealed: Urea N., 19 mg. per 100 ccm. Sugar, 120 mg. per 100 ccm. Uric Acid, 3.1 mg. per 100 ccm.

Repeated urine examinations were negative.



FIG. 2. Photograph of the Poller moulage showing the unusual involvement of the face.



FIG. 3. Distribution of lesions over neck, chest and arms.

The blood Wassermann test was negative.

Through the courtesy of Dr. Rosen the results of detailed studies of the lipids of the blood are available.

Whole Blood	*mg. per 100 ccm.*	*Blood Serum*	*mg. per 100 ccm.*
Total lipids	1420		
Total cholesterol	154	Total cholesterol	195
Cholesterol esters	70	Cholesterol esters	132
Free cholesterol	84	Free cholesterol	64
Cholesterol ratio, 45.4%		Cholesterol ratio, 67.5%	
Lecithin	247	Lecithin	192

Histologic examination. The sections showed dense fibrous change in the cutis. There were many giant cells both of the foreign body and Langerhans type. There were scattered a number of cells with large oval nuclei and rather foamy cytoplasm. Throughout the section there were many cells containing Sudan-positive droplets.

The histologic diagnosis was: Fibro-xanthoma.

Course. The patient left The Mount Sinai Hospital in July 1932. In October of the same year she entered The Jewish Hospital of Brooklyn where an examination of the blood showed the following: many degenerated white cells and a total leucocyte count of 12,000 with polymorphonuclear neutrophiles, 27 per cent; polymorphonuclear basophiles, 1 per cent; large lymphocytes, 2 per cent; myeloblasts, 4 per cent; premyelocytes, 3 per cent; neutrocytes, 62 per cent, and eosinophiles, 1 per cent and normoblasts 10 per 100 white cells. The diagnosis of leukemia was made there. She died two weeks after admission from this disease.

COMMENT

From the standpoint of differential diagnosis the case presented little difficulty. The eruption with its characteristic tumors and their chamois-yellow color made the diagnosis of generalized xanthomatosis of the tuberous type certain. The large number of tumors on the face and neck and the absence of lesions in the vicinity of the elbow joints was an unusual feature. The appearance of the eruption resembled somewhat V. Recklinghausen's disease, in which such nodular involvement of the face is occasionally seen. The unusually extensive eruption on the face was so striking a feature that it was decided to preserve this bizarre appearance of the patient. With the aid of Mr. Fisher of the Kern Co. a moulage was made with Negocoll and Hominit (fig. 2).

The study of the blood lipids revealed interesting findings. There was no hypercholesteremia present. The fallacious conception introduced 25 years ago that the basis of xanthomatosis, if not the etiologic factor, is a marked hypercholesteremia, is well disproved in this case which shows normal cholesterol readings of the blood. Wile, Eckstein and

Curtis (1) attacked the plausible theory of hypercholesteremia in a series of thoroughly studied cases. Rosen and Krasnow's (2) cholesterol studies in syphilis and other skin diseases showed clearly how little we may rely on the increase of cholesterol alone as an etiologic factor in disease.

The work of Wile and associates was resumed by Bloch and particularly by Schaaf (3), who found that though the cholesterol may be normal or increased, the ratio between the free cholesterol and cholesterol esters is disturbed. It was this imbalance, according to Schaaf, of the normal ratio of the lipoid constituents of the blood, usually 60 per cent of esterized cholesterols, that was of paramount importance in the formation of xanthomas. In this case the ratio between the free and esterized cholesterol was for the whole blood 45.4 per cent, for the serum 67.5 per cent respectively.

Recent studies of Michael and Nicholas (4) corroborated Schaaf's findings. They agree that Schaaf's theory is at present the most plausible explanation of the pathogenesis of xanthomas. Further work, however, is necessary to strengthen this hypothesis, which failed in a few instances.

REFERENCES

(1) Wile, U. J., Eckstein, H. C., and Curtis, A. C.: Lipid Studies in Xanthoma. Arch. Dermat., 19: 35, 1929, and Arch. Dermat., 20: 489, 1929.

(2) Rosen, I., Krasnow, F., and Lyons, M. A.: Cholesterol and Lecithin Studies in Syphilis. Arch. Dermat., 27: 383, 1933.

(3) Schaaf, F.: Der Lipidstoffwechsel, (mit besonderer Berucksichtigung der Xanthombildung). Zentralbl. f. Haut u. Geschlechtskr., 35: 1, 193, 1931.

(4) Michael, J. C., and Nicholas, H.: Blood Lipids in Xanthoma. Arch. Dermat., 29: 228, 1934.

A CASE OF UNSUSPECTED CARCINOMA OF THE STOMACH WITH UNUSUAL CLINICAL MANIFESTATIONS

WILLIAM H. MENCHER, M.D.

[*Service of Dr. Harold Neuhof*]

CASE REPORT

History (H. N. 361127). The patient, a 48 year old man, was first seen by Dr. Harold Neuhof in May, 1931. He complained of frequent attacks of pain in the right lower quadrant, gaseous eructations and constipation over a period of several years. Ten years earlier, he had had an attack of diarrhea with bloody stools which had been diagnosed as "dysentery." Since that time, he had been investigated in several clinics both in this country and abroad but no definite diagnosis was reached. The examination by Dr. Neuhof revealed only slight lower quadrant tenderness. There were no other objective findings, and gall bladder and gastro-intestinal X-Ray studies were also negative. He gave the impression of being a neurotic. However, in view of the persistent, though vague abdominal symptoms, coupled with the patient's demand for relief, he was finally subjected to laparotomy. The exploration carried out in November, 1932 disclosed a sclerotic lesion of the terminal ileum with kinking, dense perileal adhesions; several scars in the intestinal wall at the mesenteric border of the ileum extending over an area of 2 to 3 inches; and a stenosed appendix. The gall bladder was palpated and found to be normal. The stomach, however, was not explored, because the symptoms did not appear to warrant enlargement of the incision for this purpose. The appendix was removed, and the ileum freed by separating the adhesions. It was thought that the bloody stools present ten years before had probably been associated with the lesion in the ileum. The patient convalesced satisfactorily and was discharged from the hospital. Two months after the operation he again began to experience pain in the lower abdomen. Five months later he was referred to the consultation clinic of The Mount Sinai Hospital for further investigation. *Blood, urine, stool, gastro-intestinal X-Ray,* and *sigmoidoscopic* examinations were all found to be negative. A Rehfuss test meal showed a free acid of 56 and a total acidity of 74. He was also interviewed by a psychiatrist who was of the opinion that there was a dominant psychic factor in the clinical picture. But as he complained of marked aggravation of the pain, anorexia, loss of weight, nausea, gaseous eructations, and obstinate constipation, he was readmitted to the hospital (January, 1934). The day before admission he experienced sudden sharp lower abdominal pain radiating to both lumbar regions. His

abdomen was rigid, and he was unable to walk. The temperature was 100.8°F., pulse 106, and respirations 48. Because of distension and rigidity, palpation of the abdomen was difficult. X-Ray examination of the abdomen without barium showed the presence of a large quantity of gas in the large and small bowel, both of which were dilated. In the opinion of the radiologist, the roentgenogram was not that of intestinal obstruction. Roentgenograms of the chest at this time were negative. It was felt that in view of the finding at the previous operation of an infiltrated area in the terminal ileum that a lesion in this region might be responsible for the present symptoms. An exploratory laparotomy was performed by Dr. Neuhof on the day following admission. On opening the abdomen, the peritoneal cavity was found to contain a thin odorless pus which had gravitated to the lower abdomen and the cul-de-sac. The bowel itself showed no evidence of an acute inflammation, and the condition was regarded as a pyoperitoneum rather than a peritonitis. The source of the purulent material could not be determined. The terminal ileum was delivered in order to investigate the lesion seen at the previous laparotomy. The lesion was found to be the same as before: the same local infiltrated area, without alteration in size, and without inflammation of the serosa about it. It was obviously not the cause of the peritoneal exudate. Cultures taken from the peritoneal cavity were sterile. Abdominal puncture in the upper abdomen revealed similar purulent material which was likewise sterile. Under general supportive and symptomatic treatment, including stomach siphonage and intravenous drip, the paralytic ileus gradually subsided.

About six days after operation the patient developed signs of bilateral pneumonia, confirmed by X-Ray examination. Although later roentgenograms showed early resolving pneumonia, the signs on the left side were that of fluid, and aspiration revealed a thin non-purulent effusion which again proved to be sterile on culture. At this time, the temperature fluctuated between 99° and 101°F. and at times, rose to 104°F. In view of the sterile peritoneal and pleural exudates, (Guinea pig study later was reported negative), the diagnosis of tuberculosis was entertained.

One month after the second operation, the patient began to cough and expectorated purulent sputum. The signs of fluid in the left chest became more marked, and there was further elevation of temperature. Later the sputum became frankly foul, and it was felt that this was not the sputum of a putrid lung abscess but rather that of an intestinal communication. This impression was supported by the fact that the physical signs in the chest now included tympany, suggestive of a perforated lesion. Aspiration of the chest revealed air and foul fluid. An intestinal lesion, probably in the region of the splenic flexure with perforation through the diaphragm was, therefore, suspected. The condition of the patient at this time was desperate and operation was considered as the only measure indicated.

Under local anesthesia, posterolateral excision of the 7th and 8th ribs was performed. The presenting lung was found to be gray-green in color and of putty-like consistency. On aspiration, exceedingly foul material, similar to that which was expectorated by the patient, was obtained. The tract was split open and a large gangrenous, liquefying lesion of the lung was encountered. This was partly evacuated by suction and a tube was inserted. The patient's condition at the time of the operation was grave, and he died soon after.

Necropsy findings. The essential anatomical findings were as follows: The large and small intestines were dilated and injected except at the terminal foot of the ileum which appeared to be constricted. The peritoneum everywhere appeared to be congested. In the region of the splenic flexure there were dense adhesions. When the adhesions were separated, a collection of yellow-green turbid material was found in the perisplenic area, which extended to the under surface of the left leaf of the diaphragm. About 2 cm. lateral to the oesophageal hiatus there was a small perforation through which the purulent material drained into the left lower lobe. There was a similar collection of material situated between the right lobe of the liver and the right leaf of the diaphragm, walled off below by adhesions of peritoneum to the posterior abdominal wall. On opening the stomach, a large oval ulcer, 13 cm. x 7 cm. was found to occupy the posterior surface along the lesser curvature, with the upper margin lying at the cardia. The margin of the ulcer was raised several millimeters and was indurated, gray, and irregular. The base of the ulcer was granular, irregular, and vascularized. The left lobe of the liver and pancreas could be seen shining through it. The wall and base of the ulcer were intact. No direct communication between the ulcer and the collection of pus on either side could be found.

Microscopically, the ulcer of the stomach was found to extend through the muscularis mucosae which was infiltrated by carcinoma. At the base of the ulcer there was pancreatic tissue.

COMMENT

Highly significant in this case is the fact that insufficient weight was given to the subjective complaints of the patient because of the vague symptomatology and the negative objective findings including repeated gastro-intestinal studies by competent investigators. There was an inclination to regard the complaints as an expression of a neurosis rather than that of a serious visceral disease.

The extensive lesion in the stomach disclosed at autopsy was a complete surprise. While it was difficult to determine the age of the lesion from its size, it was, nevertheless, felt that the ulcer was present for a considerable length of time. It is not uncommon for such a lesion near the cardia to escape detection, as in this case, in spite of careful roentgenologic studies.

Although at autopsy, no perforation was found in the ulcer, it was undoubtedly present at some time in the clinical course and had subsequently sealed over. In the interim, subphrenic abscesses were formed.

The sterile peritonitis with its acute peritonitic picture was probably a sympathetic reaction to the subdiaphragmatic collection of pus. It was this combination of sterile peritoneal and pleural exudate which led several of the observers to consider the diagnosis of tuberculosis.

One of the assumed causes of empyema is a direct perforation of a subphrenic abscess into the pleural cavity. Dr. Neuhof states that he has as yet to see such a case. For a time, he felt that this case might have been the first to establish such a relationship, but subsequent events revealed that the subphrenic collection of pus communicated directly with the lung and that the pleural effusion was secondary to the pulmonary lesion.

ANEURYSM AND THROMBOSIS OF THE LEFT CORONARY ARTERY WITH ANEURYSMS OF THE LEFT VENTRICLE AND INTERVENTRICULAR SEPTUM[1]

BENJAMIN ELIASOPH, M.D.

[*Service of Dr. B. S. Oppenheimer*]

Aneurysms of coronary arteries are rare findings even in large autopsy material. In the case to be described such an aneurysm was found associated with aneurysmal dilatations of the left ventricle and disseminated myocardial fibrosis.

CASE REPORT

History (H. N. 358783). The patient, a man of 58 years, was admitted to the hospital on October 30, 1933. For many years he complained of severe headache, dyspnea and orthopnea. During the past ten years these symptoms became progressively more severe. At the onset of this period there was also some vague precordial and epigastric pain. Apparently it was regarded as being due to duodenal ulcer, but roentgenograms taken at that time were negative. In the last five years, there were several attacks of nocturnal dyspnea. Throughout this time the patient continued to work as a salesman. Three years ago he noticed swelling of his ankles aggravated by being on his feet a good part of the day. Occasionally at such times, he had had coughing attacks with slight hemoptysis. Ten months ago following an illness thought to have been pneumonia, he became bedridden. Since that time he had been suffering from general weakness, vertigo, and rapidly increasing edema. On several occasions he voided what he thought was bloody urine, and two months prior to entering the hospital he passed two stones.

Examination. The patient was a moderately obese man. He was slightly cyanotic and showed evidence of dyspnea and orthopnea. At times his respiration was of the Cheyne-Stokes type. The breath had a marked uremic odor. There were signs of fluid at the right base, and the heart was enlarged to the left. The heart sounds were distant; there was a systolic murmur; and the second pulmonic sound was of greater intensity than the second aortic. The liver was enlarged and was felt 4 cm. below the costal margin. The retinal vessels were arteriosclerotic. The blood pressure was 110 systolic and 76 diastolic, the venous pressure 7 cm. of water.

[1] Presented before the clinical pathological conference of The Mt. Sinai Hospital, November 29, 1933.

Laboratory data. Hemoglobin, 81 per cent; blood count, normal.

Blood chemistry: Urea nitrogen, 27 mg.; total protein, 6.7 per cent with normal albumin-globulin ratio; calcium, 816 mg.

The blood Wassermann was negative.

Excretion of phenolsulphonephthalein, 80 per cent in two hours.

The urine had a specific gravity at times as high as 1018 and only occasionally contained traces of albumin.

An electrocardiogram showed low voltage in all the leads with widening and notching of the main deflection. This was reported as being indicative of poor myocardial function.

Course. Shortly after admission the patient became confused and irrational. His knee and ankle jerks could not be elicited, but there were no other alterations in reflexes. A lumbar puncture revealed normal cerebrospinal fluid. Neptal was then administered. At first there was some diuretic response, but very soon the drug became ineffectual. The edema shifted in its distribution to the dependent parts of the body; the ascites became less marked, while the gluteal and sacral edema increased, and the liver became smaller. On the seventh day after admission gallop rhythm was first noticed. Two days later the patient lapsed into coma and the respirations became deep and sighing. The blood carbon dioxide at this time was 34 volumes per cent. A second lumbar puncture was performed, and clear cerebrospinal fluid was obtained under normal pressure. Throughout the clinical course the temperature remained normal. The patient died on the tenth day after admission.

Necropsy findings. The heart was flabby and enlarged; it weighed 480 gm. Both ventricles were dilated. The posterior portion of the left ventricle close to the apex was the seat of an aneurysmal dilatation (fig. 1); it measured about 4 cm. in diameter at its base and was raised to about 2 cm. above the level of the surrounding epicardium. The myocardium in this region was yellowish, and contained scattered soft reddish areas. The interventricular septum bulged into the right ventricular cavity. At its extreme convexity, over an area of about 3 cm. in length and 2 cm. in width, it was translucent and reduced to the thickness of writing paper. The musculature in many areas was degenerated and was replaced by whitish scar tissue similar to that found at the apex of the left ventricle. The aorta showed advanced atheromatous changes.

The coronary arteries were sclerotic and showed many necrotic areas in the vessel walls. The right coronary and the descending branch of the left were filled with old and fresh thrombi. The lumen of the left circumflex was obliterated by the sclerotic process but contained no thrombus. About 1 cm. below its orifice, the descending branch of the left coronary artery showed an abrupt transition into a spherical aneurysmal sac (fig. 1). The latter measured 7 mm. in diameter. It was entirely filled with a thrombus, brownish-gray at the periphery and red in the center.

Microscopic examination of the coronary artery in the region of the aneurysm showed a dilated lumen with extensive irregular atheromatous changes of the vessel wall and almost complete disappearance of the media. In one area, external to the intima but without any break in the continuity, there was a small thrombus of old and fresh blood. This thrombus was completely covered by adventitia which uninterruptedly surrounded the rest of the vessel. Without serial sections it was not possible to determine whether this was a small rupture through the intima at a higher level in the vessel or whether it was part of a small dissecting aneurysm. The smaller branches also showed markedly advanced arteriosclerotic changes

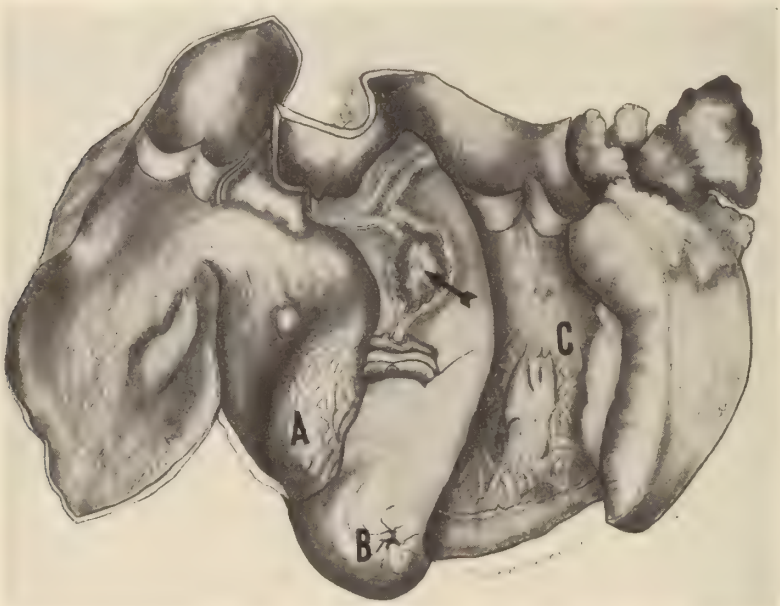


FIG. 1. Drawing of heart opened in the course of necropsy studies. Arrow points to thrombus in the aneurysmal dilatation in the descending branch of the left coronary artery. *A*. Aneurysmal bulge of the interventricular septum into the right ventricle. *B*. Aneurysm of the apex of left ventricle. *C*. Left ventricle.

and an unusually large number of giant cells. The heart muscle histologically showed marked diffuse myocardial fibrosis in large and small patches.

The lungs were congested. Several hundred cubic centimeters of fluid were found in each pleural cavity, but only 1 liter of fluid in the peritoneum. The kidneys showed advanced sclerosis of the larger arteries as well as of the arterioles. The left kidney weighed 70 gm. and the right 125 gm.

COMMENT

Aneurysm of a coronary artery is a rare condition. In the case here reported it was most likely produced by two factors, i.e., a weakened

necrotic patch in the vessel wall and increased local intravascular pressure. The latter was brought about by the resistance to the blood flow caused by the total occlusion of the vessel by a thrombus in a part distal to the site of the aneurysm. The symptoms presented by the patient were in the main those of chronic cardiac decompensation. The aneurysmal dilatations of the left ventricle into the right ventricle and at the apex were not associated with clinical signs to indicate their existence. Incidentally, the condition of the kidneys as found at necropsy could not be suspected during the clinical course. Damaged as they were they permitted only an occasional escape of albumin into the urine and were capable of concentrating urine up to 1018 specific gravity, and of excreting 80 per cent of injected phenolsulphonephthalein.

BENIGN ADENOMA OF THE TRACHEA (AT THE BIFURCATION)

HERMAN HENNELL, M.D.

[*Service of Dr. Harry Wessler*]

This is a case of a young girl of 13 in whom a benign pedunculated adenoma situated at the bifurcation of the trachea produced a partial obstruction of the openings of both main bronchi, the right more than the left. The resulting bilateral suppurative bronchopneumonia in the lower lobes ran a severe and protracted course (over 4 months) but was followed by recovery. The localization of the adenoma at the bifurcation of the trachea and the bilaterality of the resulting symptoms make the case unique.

CASE REPORT

History (H. N. 365120). A school girl of 13 was admitted to the hospital on April 19, 1934 in the third month of her illness. Her chief complaints were cough productive of purulent sputum, septic temperature, pain in right chest, severe dyspnea, and loss of twenty pounds in weight.

From the age of seven months until she was seven years old the patient was receiving radium treatments for "birthmarks." This resulted in considerable injury and deformity of the structures above the right eye and led to cataract formation in the eye requiring an operation seven months before admission. In August 1933 the patient began to experience paroxysms of "heavy breathing" with wheezing lasting for short periods of time. In January 1934 she had a brief episode of illness with moderate fever and productive cough which was diagnosed as "pneumonia." Three weeks later fever and cough recurred. She was confined to bed for four weeks following which all the symptoms disappeared, and she remained well for three weeks. Four weeks before admission there was another recurrence of her previous symptoms and, in addition, chills and sweats developed. The temperature soon assumed a septic character, ranging from 99° to 105°F. One and a half weeks before admission pain in the right lower chest appeared and dyspnea became increasingly severe.

Examination. The patient appeared very ill. She was acutely dyspneic and somewhat cyanotic. The lungs showed markedly impaired resonance over both lower lobes, more pronounced on the right; at both bases the breath sounds were harsh; a few dry râles were heard over the right base. The trachea and the mediastinal structures were not displaced. The most

striking feature was the presence of a coarse wheeze which was heard over both lungs. The heart was overacting but normal otherwise. Blood pressure was 92 systolic and 54 diastolic. No significant adenopathy and no clubbing were present. Liver and spleen were normal.

Laboratory findings. Hemoglobin 68 per cent; white blood cells 39,900, with segmented polymorphonuclears 28 per cent, non-segmented polymorphonuclears 58 per cent and lymphocytes 14 per cent. The sputum was purulent and showed no tubercle bacilli. Wassermann test and urinalysis were negative. Roentgen-ray examination showed an extensive bronchopneumonia in both lower lobes.

Course. During the first three weeks of her stay at the hospital the patient's course continued hyperacute, and her condition appeared critical on many occasions. The temperature ranged between 99° and 106.4°F. with frequent remissions to almost normal for a few days. The cough and expectoration were of moderate severity. The dyspnea was most distressing, necessitating at times the upright or the bent-forward positions. The coarse loud wheeze continued to be heard, its intensity varying from time to time.

The clinical impression of the case shortly after admission was that a bilateral suppurative bronchopneumonia was present probably secondary to an obstructive lesion high up in the bronchial tree. The latter supposition was based upon, firstly, the severity and nature of the dyspnea which suggested a mechanical factor; and, secondly, the coarse wheeze heard bilaterally which suggested an obstructive factor involving the bronchial tree on both sides. The patient was too ill to be subjected to either bronchoscopic or bronchographic investigation. On May 2, roentgen-ray examination showed a marked increase in the extent of the bronchopneumonic process in both lower lobes. On May 3 and again on May 11 the leucocyte count showed practically no change from that on admission. Because of the septic temperature and occasional chills phlebitic sepsis was suspected. This suspicion was strengthened when splenic enlargement and a pleuropericardial friction rub were noted on April 29. A blood culture taken on April 21 showed streptococcus viridans (A) in one flask (the other flasks and all plates showed no growth).

However, in the fourth week of her stay at the hospital the signs and symptoms began to subside rapidly. On May 18, the roentgenogram showed considerable resolution of the pneumonic process and the temperature had remained normal for a week. On May 21, the patient was well enough to be bronchoscoped. Bronchoscopy revealed a large granular mass, apparently a pedunculated adenoma originating from the right posterior wall of the trachea, 1 to 2 mm. above the carina, almost completely occluding the opening of the right main bronchus and only partially that of the left. Biopsy was reported as adenoma originating from mucus glands. One week later bronchoscopy was repeated and the growth was punched away to the base.

The subsequent course was one of progressive improvement. The patient left the hospital June 7, 1934 symptom-free and with lungs clear. She has remained under observation in the Follow-Up Clinic and when last examined in September 1934 showed no symptoms or signs of recurrence.

COMMENT

In a recent publication Wessler and Rabin (1) reported a group of seventeen cases of benign tumor of the bronchus. In that paper they discussed in considerable detail the pathology, clinical features and course as well as the diagnosis and treatment of the condition. All their cases were unilateral, i.e. the tumor involved the bronchus on one side and resulted in a corresponding unilateral pulmonary process. The present case is unique in so far as the seat of the adenoma was at the bifurcation of the trachea and the new growth produced a "saddle" obstruction of the openings of the right and left main bronchi. The bilaterality of the resulting pulmonary process made the recognition of the underlying etiologic factor more difficult. However, the diagnosis and management of this case did not differ in principle from those described in the publication mentioned.

REFERENCE

(1) Wessler, H., and Rabin, C. B.: Benign Tumors of the Bronchus. Am. J. M. Sc., 183: 164, 1932.

ARSENICAL POLYNEURITIS OF TRUNK AND EXTREMITIES

MORRIS B. BENDER, M.D.

[*Service of Dr. Israel Strauss*]

Arsenic is a widely used metal and a well known poison. When the clinical features of a peripheral neuritis are associated with a history of gastro-intestinal irritation, dermatitis and cross ridging of the nails, then arsenic as the cause is suspected. Very often a persistent inquiry as to the source of the poison may be fruitless. Hassin (1) reported six cases of arsenical polyneuritis in which the source of the metal could not be traced. However, the detection of the metal in the excreta or tissues in quantities above the normal (2) establishes a diagnosis beyond doubt.

The following case presents a typical picture of arsenical polyneuritis in which the metal was found in large quantities in the urine, hair and skin.

CASE REPORT

History (H. N. 363604). A 43 year old housewife was admitted to the service of Dr. B. S. Oppenheimer on March 12, 1934 with the chief complaint of weakness and burning pain in the extremities. The patient was apparently well until three months ago at which time she visited friends in the country. There she developed anorexia and vomited for several days, two to four times a day, without associated diarrhea or abdominal pain. On return home she continued to vomit, though less frequently, became progressively weaker, and began to lose weight. Her skin assumed a darker hue while her finger tips became thickened and scaly. Several weeks later she revisited her friends in the country, and on the second day she suddenly began to vomit again, this time the vomiting being accompanied by diarrhea. This continued for several days and was followed by a progressive weakness of the extremities which forced her to bed, and by burning pains, tingling and numbness in the extremities, especially in the finger tips and soles of the feet. The weakness in the hands and feet finally assumed the character of a paresis.

Examination. The patient was lying helplessly in bed; the slightest movement possible was extremely painful. The skin had a deep brown appearance which was more marked on the dorsum of the upper extremities, the chest, and the abdomen. The plantar surfaces of both feet showed callus with desquamation. The mucous membranes were normal.

All deep and superficial reflexes were lost. There was marked diminution of sensation for all modalities in glove and stocking distribution (fig. 1). The vibratory and position sense was absent in the hands and feet. There

was marked weakness of the lower extremities and to a lesser degree in the upper extremities. The weakness was most pronounced distally with bilateral wrist and foot drop.

Laboratory findings. Hemoglobin 55 per cent; red blood cells, 2,480,000; white blood cells, 5,200; polymorphonuclear leucocytes, 48 per cent; eosinophiles, 8 per cent; monocytes, 3 per cent; lymphocytes, 41 per cent; reticulocytes, 6 per cent; blood platelets, 210,000; color index, 1.1. The smear also showed anisocytosis, poikilocytosis, macrocytosis, and basophilic stippling.

The blood Wassermann test was negative. The gastric analysis showed but a small amount of free hydrochloric acid after histamine injection.

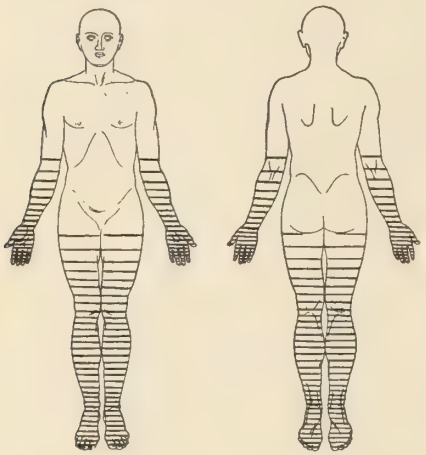


FIG. 1

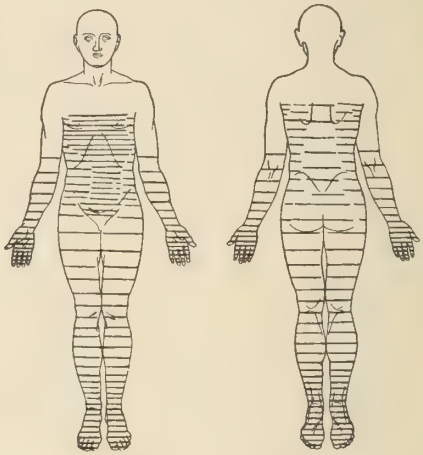


FIG. 2

FIG. 1. Typical glove and stocking distribution of impaired to absent sensation for all modalities as indicated by the shaded areas.

FIG. 2. Impaired to absent touch sensation in peripheral nerve distribution including the trunk as indicated by the shaded areas. (The degree of involvement varies with the density of the shading.) Note the involvement is least on the back and greatest on chest and abdomen.

The examination of the urine was negative except for a strongly positive reaction for arsenic.

Seven days later another examination of the blood revealed the picture of a severe secondary anemia with tendency to hyperchromia.

Course. On March 25, she was transferred to the neurological service. At this time the examination was practically the same as on admission. It included loss of position sense in all toes and fingers, absent vibration over the bony prominences of the hands, forearms, iliac crests, and lower extremities; complete bilateral astereognosis; and in performing the finger to nose tests there was ataxia which became more marked with the eyes closed. In addition, there was noted a flabbiness in the muscles of the

forearms and legs and atrophy of the interosseous muscle groups. Mechanical muscle irritability was very much reduced. Since the electrical tests were very painful to the patient, it was difficult to pick out the muscles which showed complete or partial reaction of degeneration. However, there were definite evidences of incomplete reaction of degeneration, and these were more prominent in the distal parts of the extremities.

The laboratory examination at this time showed: blood cholesterol, 310 mg. and cholesterol ester 115 mg. The hemoglobin increased to 75 per cent and the red blood cells to 3,550,000; white blood cells to 12,400 with 48 per cent polymorphonuclears, 4 per cent eosinophiles, 42 per cent lymphocytes and 6 per cent monocytes. Macrocytosis was still present. Examination of the skin[1] and hair was reported as positive for arsenic.

Frequent purgation, physiotherapy, and intramuscular injections of liver were the therapeutic measures employed, and the patient began to improve gradually. The wrist drop became less marked, and there was return of some motor power at the knee joints. Somewhat later the sensory disturbances assumed a radicular pattern which was mixed with the former peripheral nerve distribution. There was a patchy hyperalgesia in the presence of anesthesia in both hands. The skin of the distal portions of the extremities assumed a pinkish hue, became shiny and moist.

An attempt to hasten the improvement with induced hyperpyrexia resulted in an exacerbation of the symptoms. She felt that the "fever treatments" made her worse, and began to complain of generalized weakness and of pins and paresthesias in the extremities. Frequently she was unable to differentiate a pin prick from her subjective sensations of pins and needles. Following the third treatment there was retention of urine requiring daily catheterization. The latter symptoms suggested the possibility that the disease process may have spread to the cord. At first this view was strengthened by the fact that the sensory changes appeared over the trunk, but on careful and repeated examination it was found that the hypesthesia was most profound on the anterior part of the trunk and became less marked toward the posterior and central portions of the trunk (fig. 2). Such sensory disturbances were considered to be due not to intramedullary disease but to peripheral neuritis affecting the cutaneous nerves, supplying the trunk, with the greatest damage in their most distal portions. The only evidence of a possible spinal cord involvement, therefore, was the impairment of bladder function, and even this could have been caused by involvement of the cauda equina roots. Moreover, a lumbar puncture at this time revealed clear, colorless fluid under normal pressure. There was no block to jugular compression or abdominal strain-

[1] Each of the lower extremities was immersed in a bath of weak salt solution containing an electrode. A galvanic current was then passed through this system, and in this way arsenic in the form of arsenate salt was ionized and could be detected in the fluid containing the positive electrode.

ing. The total protein was 51 mg. per 100 c.c. The cell count was 6 lymphocytes. Wassermann and colloidal gold tests were negative.

As soon as the hyperpyrexia was discontinued, the patient began again to improve. Somewhat later she was fitted with foot braces and, at the time of discharge, walked out of the hospital with little assistance.

The patient was observed in the Follow-Up Clinic for a period of months. At the last examination she showed bilateral partial foot drop with steppage gait and weakness of dorsiflexion of foot and toes. Hand grasp was excellent. The atrophies had disappeared, and the calf tenderness was minimal. Except for absent right knee jerk and ankle jerks, all the deep reflexes were present. There was still some diminution of all modalities of sensation in "sock" distribution. The sense of position was normal in the fingers but impaired in all toes. Vibration was decreased in the fingers and iliac crests and absent over the tibia and toes. The blood count was normal, although the urine was still positive for arsenic. Obviously she has made a good recovery.

COMMENT

The diagnosis of arsenical polyneuritis in this case is obvious both on clinical grounds and on laboratory examinations, but the source of the poison is still obscure. It is possible that the patient ingested the arsenic in some form while at the country; especially may this be true when it is considered that each attack of gastro-intestinal irritation followed a few days after each arrival in the country.

The striking neurologic feature in this case is found in the extent and degree of the neural involvement which was present at the height of the clinical course. Sensory changes of the peripheral nerve type involving the trunk are unusual, and these, if not carefully evaluated, may be incorrectly attributed to cord disease. This is especially true when, in addition to the existing peripheral neuritis, there is a radiculitis including roots of the cauda equina as in this case leading to sphincteric disturbances.

Polyneuritis (multiple symmetrical peripheral neuritis) is most often due to a poison circulating in the blood, either derived from without by ingestion or developed within the body because of lack of essential vitamins or in the course of an infection. The poison usually affects the periphery of the longest nerves first, because the most distal part of the fibres are in a relatively poor nutritional state. The concentration of the noxious agent, its duration and severity determine whether the damage will extend to the shorter nerves and thus become universal.

Collier (3) is of the opinion that the end organs are the portal of entrance of the poison which spreads to the nervous system by axonic ascent. It has been noted that people who work with a soluble salt of arsenic and use only one hand develop an arsenical neuritis only in that hand. This is believed to point to the possibility that the arsenic is picked up by the

sensory end organs of the skin and then, ascending along the nerve, results in a neuritis affecting the sensory nerves only and confined locally to the hand exposed to the metal. When a poison like arsenic circulates in the blood, it is delivered to all the peripheral end organs alike resulting in the classical multiple, symmetrical peripheral neuritis. When the poison is redistributed as in this case by the fever therapy which may have mobilized the arsenic from its storage deposits, it may spread along the nerve trunks to involve the roots and to the shorter nerves and thus become generalized. Such events may explain the clinical course in the patient presented.

REFERENCES

(1) Hassin, G. B.: Symptomatology of Arsenic Poisoning with Polyneuritis. J. Nerv. & Ment. Dis., 72: 628, 1930.

(2) Myers, C. N., and Cornwall, L. H.: Normal Arsenic and Its Significance from the Point of View of Legal Medicine. Am. J. Syphilis, 9: 647, 1925.

(3) Collier, James: Peripheral Neuritis. Morrison Lectures. Edinburgh M. J., 39: 601, 1932.

FIBROMA OF THE PLEURA

NATHAN MINTZ, M.D.

[*From the Division of Laboratories*]

Benign tumors of the pleura are of sufficient rarity to warrant their description which may aid in the clinical recognition of cases in which surgery might be feasible. This is especially true in the case of fibroma of the pleura since the literature contains only occasional reports of this condition, and most of these are merely pathological descriptions (1).

CASE REPORT

History (H. N. 369086). The patient, a nurse, 64 years old, was admitted to the Gynecological Service of Dr. Frank, February 3, 1933 with the complaint of pain about the left hip and in the region of the urethra of three months duration. The previous history was irrelevant.

Clinical findings and course. The only cause for the patient's symptoms was found in the urethra which showed a slight eversion of its orifice. Examination of the chest unexpectedly revealed a large area of dullness and diminished breath sounds on the right side posteriorly from the angle of the scapula down to the base, and a few râles were heard below the right clavicle anteriorly. X-ray examination of the chest showed a dense homogeneous shadow which occupied the entire right lung with the exception of the supradiaphragmatic region and displaced the heart and mediastinum somewhat to the left. The appearance suggested an encapsulated pleural effusion or possibly a cyst. X-ray examination of the pelvis showed no abnormalities aside from moderate arthritic changes of the sacro-iliac joints commensurate with the age of the patient. She was discharged, unimproved, after four days with the diagnosis of left sacro-iliac arthritis and encapsulated pleural effusion of the right chest.

The patient was readmitted eighteen months later (July 24, 1934) to the Second Medical Service of Dr. B. S. Oppenheimer because of weakness, particularly marked during the three weeks previous to entrance. During this time she had lost three pounds in weight. Upon further questioning it was found that she had had a moderate degree of dyspnea on exertion for many years without, however, recent increase in severity.

At this time there were dullness, diminished breath sounds, and diminished fremitus over the right upper chest posteriorly, and dullness and fine crackling râles over the right upper chest anteriorly down to the third interspace. There were several superficial dilated veins over the anterior chest. The findings were interpreted as thickened pleura due to old

pleuritis with possible apical tuberculosis. X-ray examination of the chest (fig. 1) revealed no demonstrable change from the previous film, the roentgenological diagnosis remaining that of an encapsulated effusion with calcification of the pleura or possibly that of a cyst with calcification. An attempt to aspirate fluid was unsuccessful, and a sensation as of piercing cartilage was obtained when the needle penetrated the pleura.

The patient's condition remained essentially unchanged until August 9, sixteen days after admission, when it was noted that she had become increasingly drowsy, incontinent, and had vomited a few times. She became confused and subject to hallucinations. A neurologic examination revealed



FIG. 1. X-ray taken July 25, 1934, showing almost complete obliteration of the chest.

neck rigidity, spasticity and weakness of the extremities, increased deep reflexes, and absence of abdominal reflexes. The temperature at this time began to rise. A lumbar puncture yielded xanthochromic fluid under normal pressure with 4000 red cells and 30 white cells per cubic millimeter. The patient sank into stupor and died August 11, eighteen days after admission. The impression at this time was that a subarachnoid hemorrhage had occurred secondary to a ruptured arteriosclerotic aneurysm.

Necropsy.[1] The significant findings were confined entirely to the chest. The right pleural cavity was almost completely filled by a huge ovoid

[1] The autopsy was performed August 11, 1934 by Drs. Otani and Mintz. Permission for examination of the brain was not obtained.

mass (fig. 2) measuring 15 by 25 by 8 cm. It was well encapsulated, did not invade any lung tissue, and was covered by much thickened pleura adherent posterolaterally to the chest wall. This mass was firm throughout except for several ill-defined areas which were somewhat softer in consistence. On the posterolateral aspect of this mass at about its middle was a small knob-like protuberance of exceedingly dense consistence which on section presented a homogeneous pearl-gray translucent appearance. The apex of the lung was represented by a thin crescent-shaped condensed mass. On the medial side of the tumor mass was another small



FIG. 2. Huge fibroma in the right pleural cavity. *A*, compressed right upper lobe. *B*, compressed right lower lobe. *C*, narrowed right main bronchus.

portion of lung tissue, also greatly flattened and compressed, both representing the only visible remnants of the right upper lobe. The entire mass together with the remnants of lung tissue weighed 1275 grams.

The tumor was solid and cut with difficulty. Its cut surface presented a variegated appearance. The major portion of the tumor was made up of fairly compact strands of yellowish-white tissue of somewhat rubbery, fleshy consistence. Scattered throughout the mass were irregular, poorly defined cystic areas which contained serosanguineous fluid and mucoid material. Elsewhere were hemorrhagic necrotic areas of irregular size

and shape, not well demarcated from the surrounding tumor tissue. Other areas consisted of a necrotic amorphous material which crumbled on handling. The growth as a whole was poorly vascularized.

Microscopically, the tumor tissue consisted of a diffuse and heterogeneous arrangement of loosely grouped cells. The latter resembled fibroblasts with dark nuclei and were imbedded in a loose edematous stroma. In several areas irregularly scattered throughout the tumor, the cells were much more compact, less edematous, and of a fibrocytic character. There were a few infiltrations of lymphocytes, plasma cells, and red cells. A number of irregular lacunae containing amorphous pink homogeneous material and a varying number of thin-walled congested blood vessels were present.

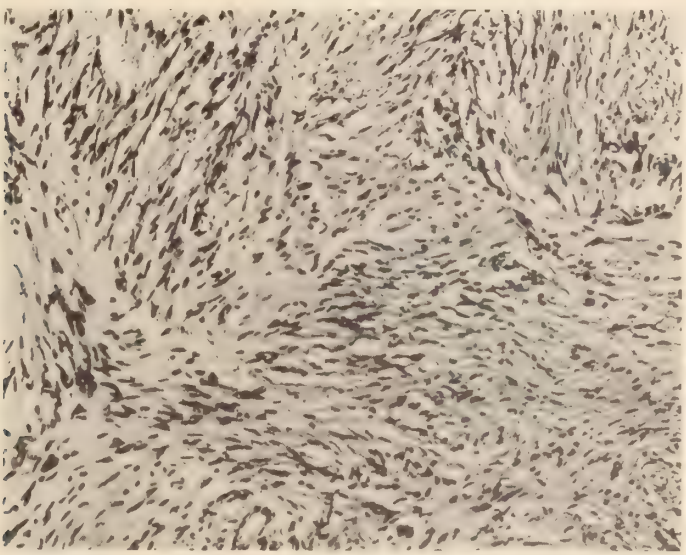


Fig. 3. Microscopic appearance of the fibroma of the pleura

The right middle and lower lobes were very much compressed and reduced in size. On section they were dark purplish-red, of somewhat increased consistence, and slightly crepitant. The larger bronchi were moderately compressed, the walls considerably thickened, and the cartilaginous rings calcified. The mucosal surface was covered with a thick, grayish-white, mucoid material which was removed with difficulty, but there was no actual obstruction to the bronchi at any point. The vessels showed no gross changes. The hilus and paratracheal nodes were somewhat enlarged and anthracotic.

The pleura on the left side was slightly thickened and roughened by many fine adhesions to the anterior, lateral, and posterior chest wall. The

left lung weighed 480 grams, was reddish-purple, and moderately crepitant. The cut surface was somewhat congested; the bronchi and vessels showed no gross changes.

The right auricle and ventricle of the heart were moderately dilated but not hypertrophied, and with the exception of mild sclerotic changes of the coronary vessels the heart presented no other important findings.

COMMENT

That this exceedingly large tumor was slow growing and had been present for a number of years can be assumed from the striking similarity of the two roentgenograms taken eighteen months apart and also from the almost complete absence of clinical symptoms of pulmonary disease. The perfect encapsulation, the lack of metastases, its non-invasive character, and the histologic structure of the tumor point to its benign character. In all these respects the case was typical of fibroma of the pleura.

It would thus seem that such a condition may be suspected in a person presenting the following features: a mass within the chest having a sharp outline roentgenologically and enlarging at an exceedingly slow rate over a period of many years without provoking symptoms. Since the lung tissue itself is not invaded, there need not be any cough, sputum, or hemoptysis. Occasionally a dilated vein upon the surface of the tumor may rupture, causing hemorrhagic pleural effusion and secondary adhesions; this may cause slight chest pain, fever, or dyspnea. Since the tumor enlarges slowly, the loss of lung tissue as the result of pressure is compensated by the development of compensatory emphysema, polycythemia, and hypertrophy of the right ventricle. Only when it has grown to such a size as to fill nearly the entire hemithorax does it cause dyspnea or signs of right ventricular insufficiency.

According to Wessler and Jaches (2), these tumors present a characteristic roentgenologic picture by their nearly perfect spherical contour, extremely sharp outline, and marked density. These findings may, however, be obscured by hemorrhagic effusion or dense pleural adhesions. Since they are often pedunculated and project freely into the pleural cavity, they are ideal from the standpoint of surgical approach and removal. In some cases, however, either because of their enormous size or lack of pedunculation (as in the case described above) surgery is very difficult. Excision of portions of the tumor may be followed by recurrence. A tendency for the tumor to assume more and more the characteristics of a malignancy (fibrosarcoma) after repeated partial excision with recurrence was noted in the case described by Lilienthal (3). Nevertheless, the malignant tendency is rarely very marked, and the tumor may reach an enormous size without producing any metastases. A number of tumors of the pleura have been reported as "giant sarcoma." In spite of being named "sarcoma" and of being large in size they are also relatively

benign, since they also produce no metastases. The line of demarcation between fibroma and fibrosarcoma of the pleura need not be quite so sharply drawn as in other cases where a distinction must be made between a benign and malignant condition. Klemperer and Rabin (4) draw a sharp distinction between localized tumors of the pleura, of the type described above, and those of a more diffuse nature, the so-called mesotheliomata. The latter, as the name implies, arise from the mesothelium or surface lining cells in contrast to the fibromata which take origin from the subpleural areolar tissue. Because of the potentialities of the mesothelial cells, these tumors may be of epithelial or connective tissue character, or combine features of both. They sometimes are so extensive as to involve the entire pleura and to ensheathe the lung.

The indications are for early surgical intervention to prevent pressure symptoms which are likely to develop, and delay increases the hazards of the operation when the tumor becomes too large. The prognosis, of course, depends largely upon the size of the tumor and the time of operation.

REFERENCES

(1) Fischer, W.: Review of the literature in Handbuch der speziellen pathologische Anatomie u. Histologie. Henke u. Lubarsch. Berlin, Julius Springer, 3: (part 3) 562, 1931.

(2) Wessler, H., and Jaches, L.: Clinical Roentgenology of the Chest. Troy, N. Y., The Southworth Company, 1923.

(3) Lilienthal, H.: Giant Sarcoma of the Pleura. Arch. Surg., 21: 1379, 1930.

(4) Klemperer, P., and Rabin, C.: Primary Neoplasms of the Pleura. Arch. Path., 11: 385, 1931.

CASE OF DIAPHRAGMATIC HERNIA[1]

GAYLAND L. HAGELSHAW, M.D.

Department of Radiology

[*Service of Dr. L. Jaches*]

This case is presented to illustrate a clinical picture occurring as the result of diaphragmatic hernia.

CASE REPORT

History (H. N. 347693). A woman, aged 50 years, was first admitted to the hospital October 12, 1927. During the year preceding her admission she developed marked weakness and pallor and had lost fifty pounds in weight. In the last three months she had diarrhea with five to six movements daily without abdominal cramps or melena. The last week was marked by an elevation of temperature. There also developed edema of the legs, associated with a peculiar "creeping" sensation. The patient had been amenorrheic for six months.

Physical examination. The findings of significance were: (1) atrophy of the tongue along its edges, (2) an apical systolic murmur, (3) edema of the feet and ankles, and (4) retinal hemorrhages. Blood examination: hemoglobin, 30 per cent; red blood cells, 1,330,000; color index, 1.1; white blood cells, 2,600. The red cells showed anisocytosis. The picture was thought to be suggestive of pernicious anemia.

A Rehfuss test meal showed no free hydrochloric acid.

Roentgen examination of the chest and gastro-intestinal tract at this time were reported negative.

Course. Liver extract was administered and resulted in marked clinical improvement, the hemoglobin increasing from 31 to 72 per cent. The patient did well on liver therapy for four years. She then began to complain of weakness, difficulty in walking, slight swelling of the ankles, and paresthesias in the lower extremities.

She reentered the hospital in January 1933. Examination at this time was essentially negative. There were no neurological signs of subacute combined sclerosis. The blood showed: hemoglobin, 70 per cent; red blood cells, 5,020,000; and white blood cells, 14,600. There was only a moderate anisocytosis. Nine days after admission the patient complained of periumbilical cramps with nausea, vomiting, and distension. There was

[1] Presented before the Clinical Conference of The Mount Sinai Hospital, March 24, 1933.

tenderness in both right upper and right lower quadrants as well as tenderness in all fornices by both vaginal and rectal examinations. A mass was felt in the right upper quadrant. At this time her temperature rose to 103.8°F. but returned to normal the following day. She was treated conservatively and within three days the abdomen had become softer. This



FIG. 1. A large portion of the stomach is above the left leaf of the diaphragm. The hernia is para-oesophageal in type.

was accompanied by a remission of symptoms. Roentgenograms of the gastro-intestinal tract now demonstrated the presence of a large diaphragmatic hernia (fig. 1), para-oesophageal in type, which did not reduce itself with the patient in the erect position. The diagnosis now was evident: a temporary acute obstruction of a diaphragmatic hernia.

COMMENT

The sequence of events in this case suggests that the obstruction was probably due to an incarceration of the stomach in the diaphragmatic hernia which later spontaneously reduced itself. Such episodes in cases of hernia are not unusual although actual strangulation of the stomach is rare. The case presents a further interesting problem. Was the patient's anemia, now apparently secondary in type, a residue of pernicious anemia or was it associated with the hernia? Since the diagnosis of diaphragmatic hernia is being more frequently made by roentgen examination, study of this condition has revealed anemia as a predominant symptom in a fairly large percentage of cases of this type. The secondary anemia is presumably due to ulceration of the incarcerated stomach associated with bleeding. The negative X-ray findings at the first examination must be interpreted as indicating that the hernia was easily reducible and that at that time the hiatus was smaller. For these reasons the diagnosis was not made at the time.

The diaphragmatic hernia in the case described was presumably congenital and occurred at the most common site, the oesophageal hiatus.

ABSTRACTS

Authors' Abstracts of Papers Published Elsewhere by Members of The Mount Sinai Hospital Staff

Myelitic and Myelopathic Lesions. Moses Keschner and Charles Davison. Arch. Neurol. & Psychiat. 29: 332, April 1933; 29: 702, August 1933; 30: 226, September 1933; 30: 592, November 1933.

This is a clinico-anatomical study of 43 cases of non-systemic disease of the cord (except multiple sclerosis). The author's conclusions are summarized as follows:

1. Many cases are diagnosed clinically as "infectious myelitis" though they represent an affection of the meninges or vessels of the cord causing secondary degeneration.

2. Diffuse non-systemic disease of the cord (excluding multiple sclerosis) may be produced by: (1) toxins or (2) circulatory interference.

3. Toxins may produce spinal cord disease by affecting its ecto- or mesodermal elements or both. This series included only cases with ectodermal involvement, and the pathologic process resembled that produced experimentally by toxins introduced into the circulation or into the subarachnoid space. These cases were characterized by a rapid onset of symptoms of a level cord lesion, followed soon by evidences of multiple and diffuse lesions throughout the neuraxis; the disease was relatively short in duration and terminated fatally. Anatomically it is characterized by marked destruction of the myelin sheaths and axis cylinders, poor glial response and slight changes in the anterior horn cells.

4. The most common forms of myelopathy are those in which the lesions in the cord are secondary to circulatory interference from partial or complete occlusion of the spinal or meningeal vessels, due to disease of such vessels or to their compression by expanding lesions in their proximity. Of these, the latter, in marked contrast to the frequency of cerebral lesions due to atherosclerosis, is unusually rare, arteritis being much more common. In the arteritic cases, syphilis was the more common factor. Cases of myelopathy due to arteritis may begin suddenly or gradually; they may begin with signs and symptoms of a level lesion of the cord or may show at the onset evidences of diffuse or disseminated involvement of the neuraxis. The atherosclerotic group showed marked destruction of the ganglion cells, myelin sheaths and axis cylinders accompanied by dense gliosis. In the arteritic group the changes were similar but the glial response was poor.

5. Myelopathy may also follow trauma. The lesion may be due to: (a) direct injury to the cord substance by the traumatizing agent; (b) compression of the cord and its vessels by a bullet, fractured or dislocated vertebra with secondary circulatory interference, or (c) concussion of the cord by severe vibrations, explosions, jarring of the body, etc.

In this group the histopathologic picture varies according to the extent of the injury and duration of the disease. In most of the cases, there was marked destruction of the myelin sheaths, axis cylinders, anterior horn cells, and a poor glial response. In addition there were also found areas of focal necrosis.

6. Expanding lesions within the spinal canal may impair or destroy the functions of the cord by compression alone, or by compression which produces mild, moderate or marked circulatory interference.

7. Extra- or intramedullary expanding lesions may produce a myelopathic process which leads to cavity formation resembling syringomyelia which may be due to (a) destruction of cord substance by the expanding lesion; (b) circulatory interference within the cord from compression of the intraspinal vessels by the tumor; (c) circulatory interference caused by thickened meninges or by an extramedullary neoplasm or by both. In some cases a combination of all these factors may be the substratum for the myelopathy with cavity formation.

A Contribution to the Subject of Cerebral Embolism of Pulmonary Origin. Joseph B. Stenbuck. Am. J. Surg. 22: 330, November 1933.

In one year 81 cases of penetrating stab wounds and bullet wounds of the chest were admitted to the division of thoracic surgery at Harlem Hospital. Exploratory thoracotomy was performed in all but 6 cases. In two cases in this large series, cerebral embolism occurred. The striking fact is that *in both these cases and in no other cases* fibrous adhesions held the lung fixed to the chest wall and completely obliterated the pleural cavity in the region of the penetrating wound of the lung.

These cases are described and the marked similarities are noted, namely:

1. Obliteration of the "free" pleural cavity by adhesions causing the lung to be fixed to the parietal pleura. In one case it was due to an empyema thoracis eleven years previously and in the other the etiology was unknown.
2. Absence of suppurative process in the lung. The lung grossly appeared normal.
3. Penetration of the lung parenchyma with free bleeding, i.e., opening of vascular channels.
4. Failure of the lung to collapse because it was held to the chest wall by adhesions.
5. Vigorous respirations during administration of gas and oxygen anesthesia.
6. Cerebral insult as indicated by coma, blindness and peripheral paresis.

Pleural adhesions as a factor in the production of cerebral embolism in cases of penetration of the chest is stressed.

Dystrophia Myotonica (A Clinicopathologic Study). Moses Keschner and Charles Davison. Arch. Neurol. & Psychiat. 30: 1259, December 1933.

The authors describe two cases of dystrophia myotonica occurring in siblings. In one, a complete histopathologic study revealed changes in the muscles, endocrine glands (pituitary, suprarenal and testes) and in the nervous system. The outstanding lesion in the latter consisted of alterations in the ganglion cells of the lateral cell columns which may be considered as retrograde degenerations. The authors believe that the disease is most likely a primary affection of the muscles, a true muscular dystrophy.

Eczema of Infancy and Childhood. Samuel Peck amd G. Salomon. Am. J. Dis. Child. 46: 1308, December 1933.

Contact substances play a much more important rôle in the etiology of eczema in infancy and childhood than has hitherto been supposed. Of these the feather group was most often found to be an etiologic agent. To determine this etiologic agent patch tests were found to be of very great value.

Members of the hospital staff and the out-patient department of The Mount Sinai Hospital are invited to submit for publication in this column brief abstracts of their articles appearing in other journals.

VOLUME 2 JULY–AUGUST, 1935 NUMBER 2

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

FIBRO-XANTHOMA OF THE PRESACRAL CONNECTIVE TISSUE

SAMUEL H. GEIST, M.D.

In the first issue of the JOURNAL OF THE MOUNT SINAI HOSPITAL, Doctor Robert T. Frank reported three cases presenting unusual tumors occupying a retroperitoneal position and encroaching on the presacral hollow. To add to this group I am reporting the following case which represents a fourth type of lesion.

CASE REPORT

A woman (H. N. 365789) was referred for operation. She was admitted to the semi-private pavilion (May 4, 1934). She complained of an abdominal tumor, noticed by her only for a few months, and of progressive weakness. The patient was thin, anaemic, and apprehensive. Examination revealed two definite tumors. One was a movable, rounded, hard, nodular mass in the lower mid-abdomen. It was about the size of a large grapefruit and was not tender. Vaginal examination identified this mass as a typical fundal fibroid and disclosed another tumor separated from the uterus and adnexa and situated apparently behind the peritoneum in the hollow of the sacrum somewhat to the left of the median line. It was smooth and oval; its upper limits could not be well defined, and the entire mass seemed fixed. On rectal examination it was found to be retrorectal in situation and to have crowded the rectum to the right. Its smooth and tense surface immediately suggested the possibility of its being a sacral kidney, but excretory pyelography excluded this. Because of the anaemia and general weakness of the patient, a sarcoma arising in the presacral connective tissue or from the periosteum was considered, and, of course, the diagnosis of a fibroma in this region was also entertained.

A laparotomy was done and a supravaginal hysterectomy performed for large fibromyomata. The accompanying drawing (fig. 1) illustrates the findings at operation. Behind the cervix just to the left of the median line a hard, smooth, rounded tumor could be felt lying in the sacral hollow. It extended from the spine of the ischium to the sacral promontory. The rectum was pushed to the right, and the ureter could be seen coursing along the left border of the tumor. The incision in the broad ligament originally

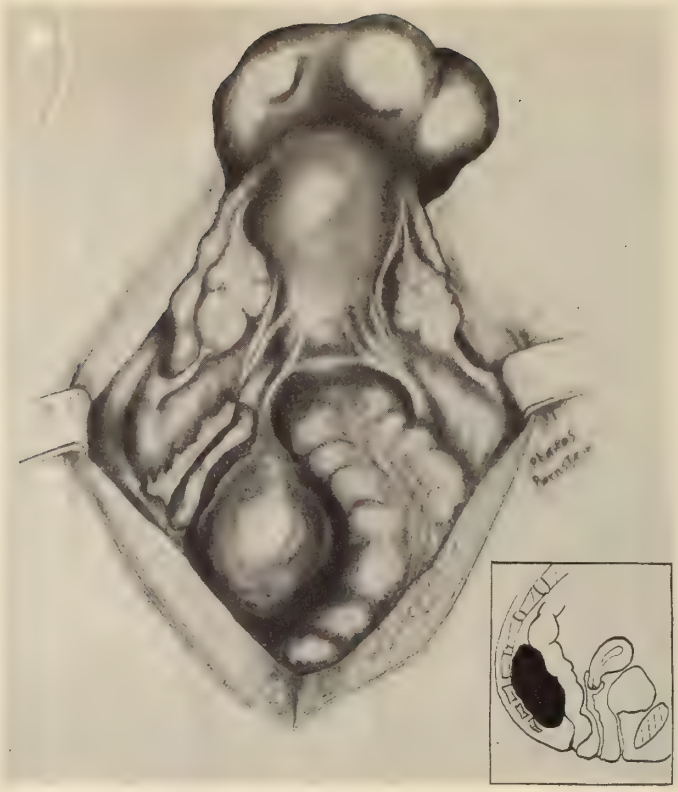


FIG. 1. Showing conditions found at the operation. Relation of tumor to pelvic viscera.



FIG. 2. Tumor bisected showing the collapsed cyst in the center surrounded by solid tissue which is a bright orange-yellow color in the original specimen.

made to remove the uterus was continued downward and then to the right over the tumor. By blunt dissection the rectum and the ureter were pushed well beyond the tumor. This facilitated the exposure of the neoplasm which, without great effort, was freed from the sacrum and removed.

The tumor measured 6 x 6 x 11 cm. It was roughly oval in shape, smooth, firm and elastic. On section it presented a light orange-yellow color, streaked irregularly by white lines of connective tissue. The center of the mass was cystic, probably degenerative in origin (fig. 2).

Histological sections of the tumor showed it to be cellular and covered by a fine connective tissue capsule. The tumor tissue was well vascularized and consisted mainly of fusiform cells with large, oval, central nuclei. Some of the cells were oval and pale. Fat was distributed in globules in all of the cells and to some extent in the intercellular substance. Connective tissue fibrils surrounded the cells, forming an interlacing network.

The diagnosis of fibro-xanthoma of the presacral connective tissue was made by Dr. Klemperer.

COMMENT

The case is of interest because of the unusual site and the rarity of this type of tumor. What stimulates the tumor cells to accumulate the lipoid material is still an undecided question. In this particular case the chemical examination of the blood failed to disclose any metabolic anomaly.

Aside from some gastro-intestinal disturbance the patient made a good postoperative recovery and was discharged well. When last seen six weeks ago, she was in good health.

TUBERCULIN AS A DIAGNOSTIC AID IN RENAL TUBERCULOSIS

GORDON D. OPPENHEIMER, M.D.

[*Surgical Service of Dr. Edwin Beer*]

The diagnosis of renal tuberculosis usually offers little difficulty. The presence of pus and tubercle bacilli in the urine of one kidney with corresponding typical pyelographic changes as opposed to negative findings in the other kidney will ordinarily establish the diagnosis and indicate the treatment, nephrectomy. In rare instances, however, in which the diagnosis is suspected but cannot be adequately proven, confirmation of such a diagnosis is very valuable before an operative procedure is undertaken.

The following case illustrates the use of tuberculin in establishing a diagnosis in such an instance.

CASE REPORT

History (H. N. 314790). The patient, 24 year old male, gave a six year history of pain in the right loin radiating toward the penis during the past year. The pain was inconstant and was occasionally associated with right lower quadrant pain, cramp-like in character. Fever and chills were absent. No urinary symptoms were present except slight frequency and nocturia. Seven months before admission (October 1929), the patient's urine was found to contain a small amount of pus and blood. Cystoscopic examination of his bladder by a competent urologist at another institution revealed an adherent slough which was situated behind and to the right of the trigone. The ureter orifices were normal. No indigocarmine was obtained from the right side and on this side a catheter was obstructed at 20 cm. A right pyelogram revealed a picture similar to the one obtained later on this service. Following this procedure the patient had a marked reaction with severe bladder symptoms and bleeding. The persistence of these symptoms led to the performance of a suprapubic cystotomy, at which time an ulcer surrounded by inflamed mucosa was found and carbolized. A specimen removed at operation was reported as showing chronic inflammation. He was discharged with the diagnosis of right ureterohydronephrosis and ulcer of the bladder. The suprapubic tube was in place for two and a half months before it was removed. Smears and guinea pig examinations were negative for tubercle bacilli on repeated occasions. The suprapubic sinus never completely closed, and there was intermittent suprapubic leakage. Following operation, the patient was free from symptoms for two months. Then he again began to experience

right loin pain, and two weeks before admission he had a very severe attack of pain associated with chills and high fever.

Examination. On admission (May 28, 1930) the right kidney was palpable and tender, and there was a firm nodule in the right lobe of the prostate. The rest of the physical examination was essentially negative. The phenolsulphonphthalein test showed 60 per cent excretion in four hours. The blood urea was normal. X-ray examination showed two small shadows in the region of the right kidney. The chest X-ray showed an area of



FIG. 1. Retrograde pyelogram. Note stricture at the pyelo-ureteral junction

old fibrosis at the right apex. On cystoscopy, the right ureter orifice was seen to be slightly swollen. No ulcer was present. A No. 4 catheter was passed to the right pelvis. The left pelvis was catheterized with a No. 5 catheter. Indigocarmine was weaker on the right than on the left. Urea excretion was equal. Microscopic examination of the urines showed a moderate number of white blood cells on the right side with an occasional white cell on the left side. Smears of both kidney and bladder urines were repeatedly negative for tubercle bacilli as were the guinea pig examinations.

Retrograde pyelograms as well as an intravenous pyelogram showed a moderate dilatation of the right pelvis and multiple strictures of the right ureter (fig. 1). Just below the pyelo-ureteral junction the ureter appeared to be markedly stenosed.

Diagnosis. The outline of the ureter as it appeared in the pyelogram was suspicious of tuberculosis. The kidney itself, however, gave no evidence of disease except for a slight hydronephrosis, and the diagnosis of the renal lesion was uncertain. Therefore, tuberculin was used to confirm the suspicion of tuberculosis. The v. Pirquet test was strongly positive. One

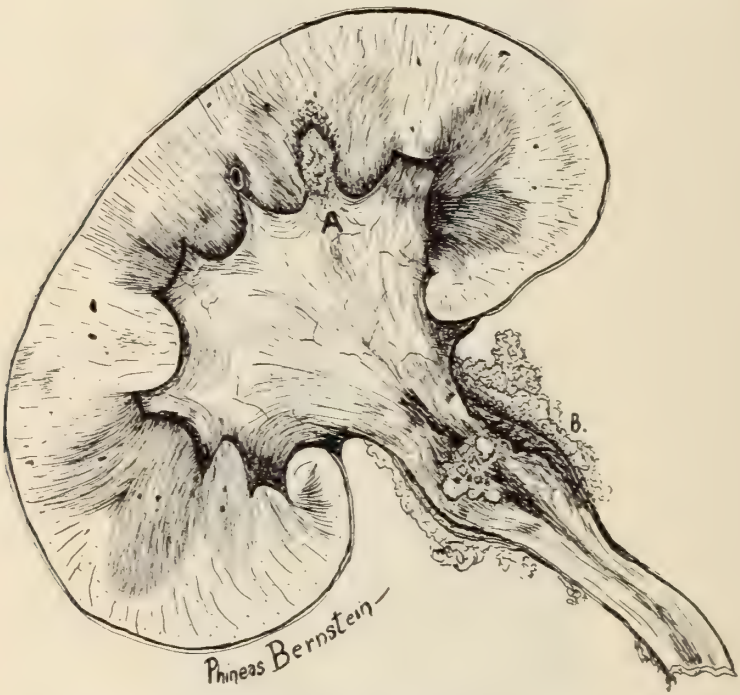


FIG. 2. Diagrammatic sketch of extirpated kidney. A. Site of old calyceal tuberculosis. B. Tuberculoma of ureter causing stenosis.

half milligram of old tuberculin was then injected intradermally. There was a marked local reaction at the site of the injection but no general or focal reaction. The bladder urine was negative for tubercle bacilli after this injection. One half milligram of old tuberculin in saline was again given subcutaneously. It was followed in 6 hours by severe pain in the right flank radiating to the right lower quadrant and by elevation of temperature to 101°F. The urine was again negative for tubercle bacilli. The same procedure was repeated three days later with the result that about eight hours following this, there developed marked right lumbar tenderness and pain with a rise of temperature to 101°F. Tubercle bacilli

were looked for following this reaction but not found. As a control test of this activation, the patient was given 300 million mixed Staphylococcus albus and aureus vaccine intramuscularly on two occasions without provoking a reaction. In view of the results of the above studies a pre-operative diagnosis of right renal and ureteral tuberculosis was made.

Operation. On July 1, 1930 an aseptic right ureteronephrectomy (Beer technique) was performed. A tiny calcium and triple phosphate stone was found in the renal pelvis. There was one small area of old calyceal tuberculosis and a tuberculous ureteritis (tuberculoma) causing a stricture just below the pyelo-ureteral junction (fig. 2). The latter lesion had the form of a small nodule which felt almost like a tumor of the ureter.

The postoperative course was smooth; the bladder fistula closed permanently, and the wound healed by primary intention. The patient was discharged well. When last seen two years later, the patient was in good health.

COMMENT

The pathological condition of the patient's ureter made it very susceptible to tuberculin activation. It is highly probable that the tuberculoma at the upper end of the ureter reacted to the tuberculin by swelling, thus increasing the existing stenosis. The obstruction led to acute dilatation of the pelvis causing marked local symptoms. The suggestive ureterogram and the striking reaction to tuberculin were the only positive preoperative evidences of the tuberculous character of the disease. The persistent suprapubic bladder fistula also pointed in the same direction.

Beer, in 1913 (1), had emphasized the value of the tuberculin reaction in the diagnosis of obscure conditions in the genito-urinary tract. The reaction is specific with but a very small percentage of error and is characterized by two or three features: (a) a general febrile reaction; (b) a distinct focal reaction as shown by spontaneous pain or increased local tenderness; and (c) an increase of tubercle bacilli in the urine; the tubercle bacilli may appear in the urine for the first time after such activation. In this instance, the ureteral block may have prevented this occurrence.

In the exceptional case, as above described, the tuberculin test may prove to be the deciding diagnostic step. Useful, however, as it might be, it should be employed only as a last resort in cases in which other diagnostic methods have failed to establish the tuberculous character of the lesion. The tuberculin test is not without its dangers, and hence every precaution should be exercised in its application. The initial dose of tuberculin should be thoroughly gauged by measuring the patient's reaction to the v. Pirquet test.

REFERENCE

(1) Beer, Edwin: The Use of Tuberculin in the Diagnosis of Obscure Conditions in the Genito-urinary System. Med. Rec., 84: 650, 1913.

PRIMARY CHOLESTEATOMA OF THE OCCIPITAL BONE

HARRY ROSENWASSER, M.D.

[*Surgical Service of Dr. Harold Neuhof*]

Primary cholesteatoma of the temporal or the occipital bone is not to be confused with the commonly encountered cholesteatoma secondary to chronic middle ear suppuration. The existence of the latter is suspected when there is an associated marginal perforation of the tympanic membrane, chronic otorrhea, and X-ray evidence of disease of the mastoid. Primary cholesteatomata are rare, and few have been reported. Alpers and Harrow (1) could not find more than a dozen cases of cholesteatoma of the skull bones recorded in the literature. Such tumors were found in the frontal bone (Kahler (2)), the temporal bone (Virchow (3)), the occipital bone (Alpers and Harrow (1)), the parieto-temporal region (Cushing (4)), and the temporo-occipital region (Körner (5)).

Virchow's studies leave one in doubt as to whether these heteroplastic growths, though imbedded in the petrous and occipital bones, did not in fact take their origin from some structure in the middle ear. This view may find some support in the case reported by Körner. In that instance a large so-called primary cholesteatoma that involved the temporal and occipital bones broke down in the course of an acute infection in the middle ear. A more detailed discussion of this phase of the subject will be found in the papers of Ruttin (6), Lautenschläger (7), MacKenzie (8), Hesse (9), Kahler (2), and Grove (12). In recent years isolated cases of primary cholesteatoma of the skull bones have been reported by Lautenschläger (10), Rateau and Rouquette (11), Grove (12), and Hirsch (13).

CASE REPORT

History (H. N. 344678). A man, aged 54 years, noticed for the first time four months before admission to the hospital a swelling on the left side of his head. This area was slightly tender but not red. At the Hospital for Joint Diseases an X-ray examination of the skull revealed a defect in the left occipital bone circular in outline and with sharply delimited margins (figs. 1 and 2). In the course of two weeks the swelling subsided and the tenderness disappeared. Two and one half months later there reappeared a tender swelling over the left occipital bone. It became more painful and increased in size until it became the size of a small egg. Pain was especially severe at night. There were no symptoms of increased intracranial pressure and no fever. His physician, however, aspirated this

area and obtained pus. Shortly before admission to the hospital, he was seen by Dr. Neuhof who incised the mass and also obtained pus.

Physical Examination. The patient was not acutely ill. The temperature was 100°F. There was a swelling confined to the left occipital bone with marks of a recent incision. An otologic examination showed the drums to be intact, and all the landmarks to be distinctly visible. There was no evidence of any inflammatory process in the ears. Hearing was good. The blood pressure was 168 systolic and 104 diastolic. A few fine râles were heard over the apex of the left lung.

Course. A note by Dr. Neuhof read as follows: "When the incision was made before admission to the hospital, pus was encountered in the subcu-



FIG. 1. Lateral view, showing sharply delimited defect in left occipital bone

taneous tissues. Following its evacuation there escaped under tension and with cerebral pulsation, considerable amounts of cloudy fluid admixed with cheesy looking masses. A defect in the bone was noted and the impression was gained that the lesion was an extradural abscess associated with osteomyelitis of the skull."

Operation. Under general anaesthesia, the previously made incision was enlarged to expose the defect in the skull. There was a hiatus about one inch in diameter with circular smooth margins, obviously of long standing. Bone was freely rongeured away to enlarge the existing defect, making it approximately two inches in diameter. This allowed adequate exposure

of the underlying pathologic process. The latter, at first, gave one the impression of being a broken down tumor but subsequent examination showed it to have the characteristic appearance of a cholesteatoma. Large masses of the cholesteatoma were removed with a curette until the underlying dura was laid bare. The lesion lay directly beneath the left half of the occipital bone. It did not extend into the mastoid portion of the temporal bone, but did extend posteriorly almost to the midline. In its characteristic slow growth without any intracranial symptoms, it had depressed



FIG. 2. Antero-posterior view showing extent of lesion

the cerebellum downward and medially and had pushed the inferior surface of the occipital lobe upward and medially. There was no tendency on the part of the cerebellum or occipital lobe to expand after the tumor mass was removed. Above, the lateral sinus was laid bare; it lay in a shelf of tentorium for a distance of about two inches. The wound was packed with iodoform gauze. Smear of the pus obtained at operation revealed no organisms. There were many cholesterin crystals. The bone and tissue removed at operation were examined by Dr. Paul Klemperer, who reported

"cholesteatoma and granulation tissue, acutely inflamed." The post-operative course was uneventful. There was no pain and no middle ear discharge.

One month later the patient was readmitted to the hospital. It was planned to close the remaining defect in the skull. This was dressed and irrigated daily, but despite the healthy aspect of the defect and because the epithelium had grown down on to the dura and was intimately adherent to it, it was deemed inadvisable to close it. The insertion of a hard rubber plug was contemplated but not carried out. The patient was referred to the Out-Patient Department for further observation and care.

Four months later he was admitted for the third time, and again closure of the defect was considered. The defect was unchanged but the major portion of its base was covered by glistening epithelium. Only at the anterior lower angle was there some granulation tissue. Dr. Leo Stern took an impression of the cavity, and a hard rubber plug was made to fit it. This was put into position and the patient referred to the clinic for further observation.

COMMENT

The surprising scarcity of symptoms that accompany intracranial cholesteatomas can readily be explained by their very slow growth and by the fact that they almost always tend to decompress themselves through a defect in the skull. At times, their presence is determined only by localized tenderness or swelling as in our case. The X-ray picture in cases of cholesteatoma according to Cushing is often sufficient to establish the diagnosis. There is a separation of the outer and inner tables; they become thinned by pressure, and finally pressure absorption takes place. Cushing stated that pressure absorption is limited to the bone immediately adjacent to the tumor and is usually so sharply limited to this part that a diagnosis of the nature of the growth can be made from the appearance of the absorption of bone. At times there may be a bowing of both tables of the skull, according to Blechner (14). Occasionally, as in our case, there may be erosion of the inner and outer tables with an extradural and subcutaneous collection. It is believed that in our case surgical cure had been attained; follow-up for the past two years with X-ray examinations have revealed no evidence of recurrence.

Summary. (*a*) The case is presented as a primary cholesteatoma of the occipital bone because there was no clinical evidence of its origin from, or connection with, the middle ear. (*b*) The tumor was removed surgically, and there is no recurrence after two years. (*c*) Roentgenograms of the skull often reveal features characteristic of this disease.

REFERENCES

(1) Alpers, B. J., and Harrow, R.: Cholesteatoma Originating in the Skull Bones Causing Symptoms of Intracranial Pressure. Am. J. Surg., 18: 51, 1932.

(2) Kahler, O.: Zur Kenntnis der primären Cholesteatome des Stirnbeins. Ztschr. f. Laryng., Rhin., u. Otol., 23: 227, 1932.
(3) Virchow, R.: Über Perlgeschwülste. Arch. f. Path. Anat., etc., 8: 369, 1855.
(4) Cushing, H.: A large Epidermal Cholesteatoma of the Parieto-Temporal Region Deforming the Left Hemisphere without Cerebral Symptoms. Surg., Gynec., & Obst., 34: 557, 1922.
(5) Körner, O.: Ein Cholesteatoma verum in der hinteren Schädelgrube durch eine akute Mittelohreiterung infiziert und vereitert. Operation. Heilung. Ztschr. f. Ohrenh., 37: 352, 1900.
(6) Ruttin, E.: Zur Pathologie des Cholesteatoms. Ztschr. f. Hals-, Nasen- u. Ohrenh., 10: 59, 1924.
(7) Lautenschläger, A.: Zur Genese und Morphologie des Cholesteatoms. Klin. Wchnschr., 9: 599, 1930.
(8) MacKenzie, D.: Pathogeny of Aural Cholesteatoma. Proc. Roy. M. & Chir. Soc., London (Sect. Otol.), 24: 6, 1931.
(9) Hesse, W.: Zur Differentialdiagnostik wahrer und falscher Ohrcholesteatome nebst kurzer Kritik der bisher beschrieben kongenitalen Schläfenbein Cholesteatome. Arch. f. Ohren-, Nasen- u. Kehlkopfh., 114: 242, 1926.
(10) Lautenschläger, A.: Das Cholesteatom der Nasennebenhöhlen. Ztschr. f. Hals-, Nasen- u. Ohrenh., 19: 286, 1928.
(11) Rateau, J. and Rouquette: Le Cholestéatome primitif total du rocher. Rev. de laryngol., 40: 353, 1927.
(12) Grove, W. E.: Primary Cholesteatoma of the Temporal Bone. Arch. Otolaryng., 10: 398, 1929.
(13) Hirsch, O.: Cholesteatome der Stirnhöhle. Zentralbl. f. Hals, Nasen- u. Ohrenh., 12: 734, 1928.
(14) Blechner: Über Cholesteatome (epidermoide) der Schädelknochen. Deutsch. Ztschr. f. Chir., 70: 352, 1903.

REGIONAL ILEITIS WITH PERFORATION, ABSCESS, AND PERITONITIS

ERNEST E. ARNHEIM, M.D.

[*Surgical Service of Dr. Harold Neuhof*]

In the group of fourteen cases of regional ileitis reported by Crohn, Ginzburg and Oppenheimer (1), free perforations into the peritoneal cavity had not been noted. The chronic perforations occurred slowly enough to permit walling off by adhesions to a neighboring viscus, the parietal peritoneum or to the omentum. In the following case, in striking contrast to the above, spontaneous perforation into the peritoneal cavity with resulting abscess and peritonitis took place.

CASE REPORT

History (H. N. 353165). The patient, a married woman, 47 years old, was admitted to the hospital on June 9, 1933. Ten years ago an abscess in the region of the rectum was incised. For the following ten years she had occasional periods of diarrhea, during which times she would have several loose, brown, non-bloody stools daily. During the past four years she began to have attacks of abdominal pain, more or less generalized. A gastro-intestinal X-ray series at that time was said to have shown "growths in the stomach." After some dietary regime at this time the diarrhea was temporarily relieved, to return when the diet was discontinued. The abdominal pain continued intermittently and recurred five days before admission to the hospital. It was associated with diarrhea, but there was no nausea or vomiting. The pain grew in severity, and three days later distention of the abdomen was noted. She was then given castor oil with the resultant passage of many liquid stools. After this the pain became somewhat localized to the left lower quadrant of the abdomen.

Examination. The essential physical findings were as follows: The patient was an obese, middle-aged woman who looked acutely ill. Her temperature was 102.4°F., and the pulse 106. There were moderate abdominal distention, generalized abdominal spasticity, and slight tenderness on deep pressure on both sides of the umbilicus. Rectal and pelvic examinations revealed no abnormalities. There were 14,300 white blood cells with 82 per cent of polymorphonuclear neutrophiles.

Course. At the end of eight hours in the hospital the temperature rose to 104.6°F. There was no corresponding increase in the pulse rate. During the second day the patient was free of spontaneous abdominal pain without change in the physical signs. An abdominal puncture in the left

lower quadrant revealed milky, purulent fluid which, on spread, showed many polymorphonuclear leucocytes but no organisms. Intravenous fluids —five per cent glucose in saline—were administered continuously. On the third day there was a definite improvement in the patient's general condition; the abdomen was found to be less distended; the tenderness on the left side disappeared; and a vague mass was noted to the right and above the umbilicus. On the fourth day, however, the patient developed a marked circulatory collapse with temperature rising to 106°F. The diffuse tenderness and spasticity of the abdomen reappeared. The fifth day was marked by a drop in temperature to 101°F., but the circulatory collapse continued in spite of continuous glucose intravenously. On the sixth day the quality of the pulse improved; the temperature fluctuated between 99° and 100°F.; but the patient was noted to be icteric. Bile was found in the urine, and the icteric index was 40. The following six days were marked by a steady decline in the patient's condition; the temperature remaining normal. The urinary output was small, and the urine contained casts and red and white blood cells. A mass in the right lower quadrant could vaguely be made out. The abdominal tenderness, although generalized, was most marked in the right lower and left upper quadrants. The icterus deepened. The patient became uremic and died on the twelfth day in the hospital.

NECROPSY FINDINGS

The significant lesions were those found in the abdomen. The peritoneal surfaces were dulled and congested. There was a fresh fibrino-purulent exudate over the entire small intestine, agglutinating several loops to one another. The serosal surface of the intestines was reddened. The base of the cecum was agglutinated to the lateral and posterior parietal wall by a grayish, fibrino-purulent exudate. The appendix was thickened and showed no acute inflammation. The sigmoid was pulled over to the right side and adherent to the exudate about the cecum. There was a large pocket of thin, gray, foul-smelling pus completely walled off by the posterior wall of the uterus and the anterior wall of the rectum. There was a similar abscess walled off by two loops of ileum and their mesentery. The latter was markedly thickened and edematous. A narrow fistulous necrotic tract led from this area into the ileum about eighteen inches from the ileocecal valve. The terminal three feet of ileum were thickened and indurated. The mucosa presented a granulomatous surface with areas of ulceration with intervening intact and polypoid mucosa. There were superficial fistulous tracts, several of which extended through to the serosa and entered the abscess between the loops of the ileum. The mucosal lesion of the ileum was limited to the surface overlying the mesenteric attachment. The surface opposite the mesenteric attachment was relatively free of ulcerations. The corresponding mesentery was markedly

thickened and indurated. The lumen of the involved ileum was markedly narrowed, and the ileum proximal to this area markedly dilated. The ileocecal valve was thickened and indurated, and the lumen measured 0.5 cm. in diameter. The mucosa of the colon was congested but showed no ulcerations. (See accompanying figure.)



(1) Large mesenteric abscess. (2) Polyposis of small bowel. (3) Multiple sinuses from abscess to bowel lumen, showing tracts (Probes). (4) Fibroma of cecum (incidental finding). (5) Stenosis and thickening of bowel. (6) Ulceration, trabeculation and replacement of bowel mucosa.

Microscopic examination showed the base of the ulcerated areas infiltrated with lymphocytes, polymorphonuclear leucocytes, fibroblasts and plasma cells. The muscularis was likewise densely infiltrated with these cells. Some sections showed advanced necrosis of the serosa and muscularis.

REFERENCE

(1) Crohn, B. B., Ginzburg, L., and Oppenheimer, G. D.: Regional Ileitis; a Pathologic and Clinical Entity. J. A. M. A., 99:1323, 1932.

EPIDURAL HEMANGIOENDOTHELIOMA[1]

ABRAHAM KAPLAN, M.D.

[*Neurological Service of Dr. Israel Strauss and Neurosurgical Service of Dr. Ira Cohen*]

CASE REPORT

History (H. N. 362299). An unmarried factory worker, aged 27, was first admitted to the hospital on June 2, 1932 because of pain and stiffness of both legs of four months duration.

Her father was afflicted with "epileptic seizures"; one sister was in an insane asylum; many of her maternal folks had pigmented skin patches.

In 1918 she had an attack of "influenza"; the following year she had erysipelas, and in 1929 a "fatty" tumor was removed from her left thigh. In August 1930 she noted a "rash" over both thighs and arms. Blood Wassermann was reported positive. She was given two courses of salvarsan and bismuth within the year, and studies of the blood and spinal fluid were negative. Two months later she received another course of treatment, and on three occasions subsequently the serology was negative.

Four months before admission she first began to note stiffness and weakness of both thighs affecting mainly the anterior group of muscles. The left leg was weaker than the right. Within the next two months she began to have pain over this area, coming chiefly at night, which seemed to be relieved by flexion of the thighs. For a month before entry she was unable to work, and for two weeks she was unable to either walk or stand. About this time she noted urgency, difficulty in starting urination, and nocturia.

Examination. General examination was negative except for a large, irregular, purplish, elevated hemangioma situated just to the left of the 5th and 12th thoracic spine, measuring 10 by 15 cm. (fig. 1). There were also scattered café-au-lait blotches over the internal surface of the left arm, a very large one over the left groin extending over Scarpa's triangle, a raised melanoma 0.75 cm. in diameter over the sacrum, and numerous prickle-like pigmented spots over the clothed area of the body.

The positive neurological findings were: (1) pupils, right slightly larger than left, (2) spastic paresis of both legs more marked on the left with atrophy of the left thigh and calf, (3) diminution to all forms of sensation below the 8th thoracic dermatome sparing the sacral region, (4) exaggerated knee and ankle jerks, (5) absent abdominal responses, and (6) bilateral Babinski sign.

[1] Presented before the Clinical Conference of The Mount Sinai Hospital, January 26, 1934.

Course. A lumbar puncture showed clear fluid, 34 cells all mononuclear in type, and complete block to manometric tests. Wassermann reaction was negative, total protein 52 mg./100 cc. of spinal fluid. Following this procedure there was a surprising shift of the sensory findings, for they promptly became indistinct and soon disappeared. Manometric tests were repeated and failed to show any block; even lipiodol injected into the cistern failed to be arrested at any point in the spinal canal. She was given a course of typhoid vaccine which was followed by X-ray treatments to the spine with such gratifying improvement that she was able to walk out of



FIG. 1. Patient on discharge showing the size and position of the hemangioma

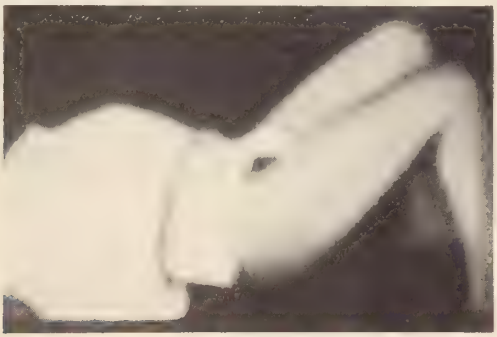


FIG. 2. Position of flexion paraplegia during seizures

the hospital unassisted on September 7, 1932. The impression was that she had an intraspinal neoplasm, possibly hemangiomatous, but, as a myelopathic process of the mid-dorsal region upon a luetic basis could not be fully excluded, she was given further antiluetic therapy.

Interval History. She continued to improve so that several weeks later she returned to work. But in December 1932 stiffness of the left big toe returned and gradually spread to involve the left leg. About this time urinary difficulties set in again. Six weeks before her second entry her right leg also became stiff, and thereafter she began to have spasms of

stiffness and flexion contractures of both legs causing her to cross them in scissor fashion (fig. 2) accompanied by twisting of the body from side to side. Curiously enough there was no pain associated with these spells. When she was no longer able to walk or stand, she returned to the hospital. She noted only slight numbness of the legs and lower trunk.

Examination on Second Admission. May 18, 1933. (1) She was observed to have distressing periodic spasms of flexion and crossing of both legs causing her to twist and turn from side to side with spontaneous dorsiflexion of both big toes and fanning of the other toes. (2) Below the 6th thoracic dermatome there was diminution of pain and temperature sensibility equally on both sides. Light touch, deep pain and position sense were intact. Vibration sense could not be detected over the right foot. There was no sparing of the sacral region. (3) There was spastic para-



FIG. 3. Blood sinuses surrounded by reticular network of connective tissue, also solid cords of cells with elongated deeply staining nuclei.

plegia of both legs and gait of steppage and scissor type. (4) Abdominal responses could not be elicited; knee jerks were hyperactive, more so on the left; the right ankle jerks could not be obtained. Babinski, Oppenheim, and Gordon signs were positive bilaterally. (5) There was tenderness over the 9th thoracic spine.

Laboratory Data. Manometric tests showed complete block. The spinal fluid was clear, under 80 mm. of water pressure with only 3 cells. Wassermann reaction was negative, total protein 45 mg./100 cc.

Operation. Laminectomy from D III to D VIII disclosed a reddish-gray, extradural tumor. It was removed piecemeal almost in its entirety except for a small portion on the left lateral portion of the cord where profuse bleeding from the remaining tumor and adjacent bone was encountered. However, sufficient tumor was removed to permit the cord to pul-

sate freely, and exploration with a catheter in both directions failed to meet any obstruction. There seemed to be no indication for intradural investigation.

Pathology. Microscopically, the tumor was diagnosed as a hemangioendothelioma. It consisted of thin-walled blood sinuses filled with blood and surrounded by a reticular network of connective tissue. In some areas there were solid cords of cells with elongated deeply staining nuclei (fig. 3). Sections of the adjacent bone showed no evidence of invasion.

Post-operative Course. Except for extreme restlessness she made excellent progress. By the end of the first week she was moving her right leg, the left one being still spastic; she voided spontaneously; sensory tests revealed no abnormality, and she no longer manifested any muscular spasms. Manometric tests on two occasions showed a freely communicating subarachnoid system. She was again given a course of X-ray treatments to her back and was discharged on July 20, 1933. Since then her gait has steadily improved, and except for slight weakness of the left leg, a little numbness of the sole of the left foot, exaggerated knee jerk on the left, and a left ankle clonus, there are no abnormal neurological signs.

COMMENT

In a recent review of 191 spinal cord tumors by Dr. Elsberg, only 4 (2.1 per cent) were angiomata; and of the 56 extradural tumors, 2 (3.6 per cent) were of this type. In addition to having a rare type of spinal cord tumor this patient's story illustrates several unusual features: (1) that even with positive evidence of lues other conditions of the central nervous system should not be dismissed, (2) that contrary to the experience of others noted especially in extradural growths which revealed a decided increase in the subjective and objective signs of spinal cord disturbance following lumbar puncture, in this patient spinal block and accompanying neurological signs disappeared after the withdrawal of spinal fluid, only to return after several months, and (3) that in the presence of an angioma of the skin in the proximity of a level lesion of the spinal cord, one should strongly suspect a similar intraspinal condition.

REFERENCES

Elsberg, C. A.: The Diagnosis and Surgical Treatment of Tumors of the Spinal Cord. Société Internationale de Chiruge, IX Congress, Madrid, March 15-18, 1932.

Ibid.: Extradural Spinal Tumors; Primary, Secondary, Metastatic. Surg. Gynec. & Obst., 46:1, 1928.

Globus, J. H. and Doshay, L. J.: Venous Dilatations and Other Intraspinal Vessel Alterations Including True Angiomata with Signs and Symptoms of Cord Compression. Surg. Gynec. & Obst., 48:345, 1929.

CHOLEDOCHUS STONE

HENRY DOUBILET, M.D.

[*Service of Dr. Harold Neuhof*]

The following case is presented to illustrate the great difficulty in diagnosing and locating certain types of small common duct stones which may be of such shape as to cause severe symptoms without, however, causing jaundice. The surgical problem involving the diagnosis and treatment of choledochus stone is reviewed.

CASE REPORT

History (H. N. 359674). The patient, a woman 38 years of age, was subjected to a cholecystectomy in 1931 in another hospital for relief of symptoms which had been present for nine years. These consisted essentially of frequent attacks of severe persistent epigastric pain, radiating to both right and left upper quadrants, to the back, and to both scapulae, occurring one and a half to two hours after meals and lasting one to three hours. At operation a somewhat diseased gall-bladder containing a large number of small facetted stones was removed. After this operation she was well for eleven months when the attacks of epigastric pain recurred unchanged in character except that on one occasion jaundice was present. Eighteen months after the first operation a choledochostomy was performed at another hospital; nothing was found to explain the symptoms. As soon as the biliary fistula closed, the attacks recurred. She was admitted to The Mount Sinai Hospital for the first time on June 17, 1933. Aside from the fact that on one occasion the icteric index was 18 although no jaundice was noted, observations did not disclose anything of diagnostic value. She was allowed to return home. She was readmitted on July 6, 1933 with a recurrence of symptoms, but was again discharged for lack of a precise diagnosis. She was put on a fat free and high protein diet. It was then noted that neither the diet nor the feeding of bile salts had any effect on the attacks of pain. It was found that atropine did not abolish them and that they tended to occur at the period of maximum flow of bile, i.e., about one and a half hours after meals. It was felt that either a stone in the common duct or a partial stenosis could best explain the symptoms.

On December 1, 1933 an operation was performed by Dr. Ralph Colp. The common duct was found only slightly larger than normal, and on opening it, a small facetted stone was found in the retro-duodenal portion. This was removed and a choledochostomy performed. Curiously enough, another similar stone, evidently spilled at the first operation, was found

adherent to the posterior wall of the foramen of Winslow. Both these stones were similar to the ones previously found in the gall-bladder.

COMMENT

That the patient's symptoms were due to the small stone removed from the common duct is indicated by the fact that she has been well since the operation. The case brings out certain aspects of the physiology of the biliary tract which are of clinical interest. The maximum flow of bile from the liver occurs about two hours after a meal. Ordinarily, the gall-bladder acts as a safety valve and receives the bile which cannot pass at the moment into the duodenum; in this way it tends to keep the intrabiliary pressure at a low level. In this case not only was the gall-bladder removed, but there was present in addition a small irregular stone in the common duct. Although the stone was not large enough to completely obstruct the duct, it decidedly reduced the diameter of the lumen. As a result, when the flow of bile was maximal, distension was produced proximal to the stone, causing a typical train of symptoms. As soon as the flow of bile lessened, these symptoms would disappear. The frequency and the constancy of the recurrent attacks indicated that spasm of the sphincter of Oddi could not be the cause. This was ascertained by the administration of atropine in doses sufficient to paralyze the sphincter. Since atropine did not reduce the frequency of the attacks and since feeding of bile salts increased the symptoms, it was felt that there must be a narrowing of the duct at one point, due either to stricture, chronic pancreatitis or to stone.

The case is also a good example of a most difficult surgical problem. In practically every operation for cholecystectomy, the question arises whether or not the common bile duct should be opened and explored for a possible stone. What factors should be considered in coming to a decision? A few statistics from a voluminous literature will bring out the gravity of the problem.

In 1923 Haggard (1) reported an incidence of 6.2 per cent common bile duct stones found in 273 operations on the biliary tract. In the same year Sherren (2) found an incidence of 18.5 per cent in 600 cases, and quoted Mayo's report of 305 cases in which choledochus stones were found in 21.96 per cent. In 1927 Colp (3) reported that 9 per cent out of 1280 biliary tract operations for calculous disease showed the presence of common duct stones at operation. In 1928 Wilkie (4) stated that choledochus stones were present in 18 per cent of his gall-bladder operative cases, and two years later Clute (5) reported an incidence of 17.9 per cent in 413 cases. In the same year Judd and Marshall (6) found that common bile duct stones were present in 13.2 per cent of 1663 cases.

It is agreed by the major surgical clinics that choledochus stones are found in about 15 per cent of gall-bladder operations. But the above are but operating room statistics and this percentage is undoubtedly lower

than the number of instances in which stones are actually present in the common bile duct. Thus in 1000 consecutive autopsies in Vienna, Crump (7) found choledochus stones in 24 per cent of gallstone cases, and there can be no doubt that the more often the choledochus is explored during the course of a cholecystectomy operation, the greater will be the number of cases in which stones are encountered. Clute (5) showed that the incidence of stones increased from 8.4 per cent to 17.9 per cent when the number of common bile ducts opened during cholecystectomy operations rose from 15 per cent to 33.8 per cent.

However, a choledochostomy cannot be undertaken lightly. It is quite evident from a review of statistics that the mortality rate for a simple cholecystectomy is only one third as high as when this operation is combined with a choledochostomy. The morbidity is also greatly increased and the postoperative hospitalization period is at least doubled.

Another disadvantage to be considered is the probability that even when the common bile duct is opened, an elusive calculus may defy all efforts to find it; and furthermore, following the removal of one or more calculi, in a surprisingly large number of cases, other stones may have been left behind. Thus Mayo (8) states that additional calculi were found at autopsy in one third of the cases that died after the removal of common duct stones; Young (9) reported that of 41 cases autopsied following operation for the removal of common bile duct stones, additional stones were found in 27 per cent of these cases.

The history of jaundice, especially when accompanied by chills and fever following an attack of gall-bladder pain, should always indicate the necessity for an exploratory choledochostomy. But it must be borne in mind that occasionally no stone is found, the syndrome being apparently due to an attack of pancreatitis (10) or to spasm of the sphincter of Oddi. Often a large gallstone in the ampulla of the gall-bladder is shown at operation to be pressing directly down on the common bile duct and causing partial obstruction. Oedematous inflammation around the neck of the gallbladder and cystic duct may involve the common bile duct with consequent temporary obstruction. On the other hand, it has been noted (1, 11) that 10 per cent of choledochal calculi removed at operation are "silent," no history of either jaundice, chills or fever being given. The need for caution is well exemplified by Clute's (5) statistics from the Lahey Clinic, where the common duct is explored very frequently. In 49 per cent of 140 cases opened for possible common duct stone, no calculi were found in spite of a history in these cases of pain and jaundice.

As a rule there is sufficient reason for opening the choledochus when at operation it is found to be thickened and dilated. But often the duct, without containing stones, is dilated in the presence of cholecystitis with or without stones. Thus Crump (7) found dilatation of the bile ducts in

21 per cent of autopsy cases with gall-bladder disease, but choledochus stones were present in only 3.5 per cent of these cases.

REFERENCES

(1) Haggard, W. D.: The Diagnosis and Management of Stones in the Common Duct. J. A. M. A., 81: 709, 1923.

(2) Sherren, J.: Stone in the Common and Hepatic Ducts. Lancet, 205 (2): 7, 1923.

(3) Colp, R.: Calculous Obstruction of Common and Hepatic Bile Ducts. Ann. Surg., 86: 890, 1927.

(4) Wilkie, D. P. D.: Address on Some Aspects of Gall-bladder Disease. Brit. M. J., 1: 481, 1928.

(5) Clute, H. M.: Common Duct Stones. J. A. M. A., 95: 1568, 1930.

(6) Judd, E. S., and Marshall, J. M.: Gallstones in Ampulla of Vater. J. A. M. A., 95: 1061, 1930.

(7) Crump, C.: The Incidence of Gallstones and Gall-bladder Disease. Surg., Gynec. & Obst., 53: 447, 1931.

(8) Mayo, W. J.: Surgery of the Hepatic and Common Bile Ducts. Lancet, 205 (1): 1299, 1923.

(9) Young, E. L.: Possibilities of Failure in the Removal of Stones in the Biliary Tract. New Eng. J. Med., 200: 1145, 1929.

(10) Judd, E. S.: Condition of the Common Duct after Cholecystectomy. J. A. M. A., 81: 704, 1923.

(11) Jordan, F. M., and Weir, J. F.: Stones in the Common Bile Duct without Jaundice. Proc. Staff Meetings, Mayo Clinic, 5: 56, 1930.

BILATERAL VOCAL CORD PARALYSIS DUE TO SYPHILIS

MORRIS S. BENDER, M.D.

[*Services of Dr. Rudolph Kramer and Dr. George Baehr*]

The desirability of a thorough laryngeal examination in cases where there is a suspicion of involvement of the larynx can not be overestimated, as impairment of the vocal cords may exist without any frank objective symptoms.

In health, and when at rest, the edges of the vocal cords are found to be slightly separated and move somewhat during respiration. They separate widely on deep inspiration. In phonation they approximate, their edges almost coming in contact. In paralysis of the vocal cords they do not move and may assume the so-called cadaveric position in which the edges are but slightly separated, much less than the normal resting cords. In unilateral paralysis the involved cord lies in the midline. As the patient is asked to phonate, the healthy cord will be seen to move towards the midline, meet the paralysed cord and in this way give the larynx a normal appearance. The paralysis, however, becomes evident on inspiration, since only one cord moves while the other remains fixed in the midline. There is under such conditions a reduction of the laryngeal aperture which results in dyspnea on exertion. In bilateral abductor paralysis which is often an incomplete recurrent laryngeal paralysis, both cords lie near the midline. On inspiration they are drawn closer together by the inspiratory suction. This causes dyspnea and stridor, and occasionally blocks the air passage so completely as to cause sudden death. Peculiarly enough, when the paralysis is complete and the cords are in the cadaveric position this is not likely to occur. However, on overexertion or in the course of an acute upper respiratory infection, alarming symptoms may appear.

CASE REPORT

History (H. N. 350092). A white married female, aged 45, was admitted to the hospital on March 8, 1933. Her main complaint was dyspnea on exertion. She was well until two years prior to admission to the hospital. She then noticed impairment of her voice and shortness of breath. It was diagnosed as asthma; tonsillectomy was advised and carried out without benefit.

Examination. The general physical examination which included a neurological status was negative. X-ray examination revealed no evidence of aneurysm or mediastinal tumor. The examination of the larynx, however, revealed the following: The left vocal cord was fixed in the midline,

and the right vocal cord was somewhat median to that of the cadaveric position. Inspiration and expiration were stridulent. The blood pressure was 136 systolic and 52 diastolic. The blood Wassermann Test was 4+. The cerebrospinal fluid was normal in all phases.

Course. The laryngeal findings and the positive serologic tests pointed to the diagnosis of bilateral abductor paralysis due to syphilis. The patient was given antisyphilitic treatment for a period of five weeks, following which marked improvement was noted in the right vocal cord. Four months ago, when seen again, the right vocal cord regained its normal function while the left cord remained paretic.

COMMENT

The etiologic relationship of vocal cord paralysis with syphilis is well known. Though more frequent in tabes dorsalis, the condition is not uncommon in other forms of syphilis with or without manifestations of involvement of the central nervous system. The involvement of the cord is believed to be due to degeneration of fibres in the recurrent laryngeal nerves. The partial response to antisyphilitic treatment supports the syphilitic etiology in this case. The results of the treatment, though incomplete, are nevertheless gratifying since in some instances the paralysed cords may so obstruct the air passage as to demand permanent tracheotomy. The erroneous diagnosis of asthma and useless tonsillectomy could have been avoided if a simple laryngeal examination had been made.

LEAD POISONING IN CHILDREN

A Report of Two Cases

GEORGE J. GINANDES, M.D.

[*Service of Dr. Bela Schick*]

The relative frequency of lead poisoning in children and its possible serious consequences have been especially recognized during the past decade. This is due to the increased interest aroused by the work of Aub and his collaborators (1), and by the demonstration of certain constant chemical, hematological, and roentgenological findings which are characteristic of plumbism. At present, this diagnosis is seriously considered in cases presenting obscure neurological or gastro-intestinal symptoms, especially when a history of perverted appetite or exposure to the noxious agent is obtained.

The following two cases of lead poisoning demonstrate the essential clinical and laboratory features of the disease.

CASE 1

History (H. N. 329557). A white female child, aged $2\frac{1}{2}$ years, had a history of perverted appetite since the age of one. The parents observed that the child ate everything within reach, particularly painted wood, oilcloth and dirt. Occasional vomiting had occurred. Eight days before admission, vomiting became pronounced and the child rejected everything offered her. She developed frontal headache and marked constipation. Five days later she became increasingly drowsy and irritable when disturbed. There were no convulsions and no abdominal pain. The temperature remained normal. The child developed generalized weakness and pallor. The symptoms increased in severity and the child was brought to the hospital.

Except for the pica, the child's past history was negative. The family history was irrelevant.

Examination. The child appeared subacutely ill and moderately dehydrated. She was lethargic. There was moderate pallor of the skin and mucous membranes. The temperature was normal. There was slight resistance to anterior flexion of the neck. The deep and superficial reflexes were normal. There was no lead line on the gums. The blood pressure was normal.

Course. Blood studies made soon after admission revealed the following: hemoglobin, 52 per cent; red blood cells 4,800,000; white blood cells

9,596, of which 86 per cent were polymorphonuclear neutrophiles, 11 per cent lymphocytes, 2 per cent monocytes, and 1 per cent myelocytes. There were moderate polychromatophilia and anisocytosis with marked basophilic stippling, the ratio of the stippled cells to the red blood cells being 1.8 per cent.

Blood chemistry studies were reported as follows: calcium 10.7 mg. per cent; phosphorous 4 mg. per cent; urea nitrogen 11 mg. per cent; cholesterol 250 mg. per cent. The blood CO_2 content was 30 volumes per cent.

Urine examination was negative for albumin, sugar, and formed elements, but the presence of lead was demonstrated.

The Schick and Pirquet tests were negative.

X-ray films of the long bones revealed increased density at the metaphyseal junctions, suggesting lead poisoning. Because of the child's convulsive movements at the time of roentgenological examination, the plates were too blurred for reproduction.

A lumbar puncture on admission yielded clear cerebrospinal fluid under normal pressure, containing 8 cells per cu.mm. The fluid was positive for globulin and negative for sugar.

Intensive treatment with parenteral fluids was immediately instituted because of the persistent vomiting and dehydration. Calcium gluconate was given in large doses intravenously and intramuscularly, the patient receiving a total of 33 gm. in the first 48 hours. On the third day, convulsive twitchings appeared which subsequently became more generalized. A lumbar puncture at this time yielded clear cerebrospinal fluid under increased pressure, containing 44 cells per cu.mm. of which 50 per cent were lymphocytes. The globulin test was positive. Routine examination for tubercle bacilli was negative. The eye grounds, which had been normal at the time of admission, were now found to show marked papilledema and small linear hemorrhages.

The convulsions remained intractible in spite of the intravenous administration of sodium amytal and the use of chloroform anesthesia. The child developed pulmonary edema; the temperature rose to 106°F., and death occurred on the fifth day after admission.

Post Mortem Findings. The kidneys and liver showed moderate parenchymatous degeneration. The heart revealed slight hypertrophy of the left ventricle and local congestion. There was moderate hyperplasia of the lymph follicles of the colon.

The brain was reported as presenting a diffuse pallor but no other gross changes. Small deposits of fat and a slight increase of the oligodendroglia suggestive of a mild degenerative process were the only histological findings. Microchemical methods applied to sections failed to disclose the presence of lead. The productive alteration of the blood vessels seen in chronic cases of lead encephalopathy was absent, and there was no evidence of inflammatory disease.

CASE 2

History (H. N. 228654). A white male child, aged 4 years, was admitted to the hospital July 31, 1931. Two weeks before admission he developed non-projectile vomiting and marked constipation. The vomitus was frequently bile-stained but never contained gross blood. Increasing pallor was observed, and the child experienced severe frontal headache. Two days before admission to the hospital, he developed increasing drowsiness, restlessness, and irritability. He refused food. Weakness became so marked that he was no longer able to stand or hold up his head. His temperature rose to 102°F.

On close questioning, it was ascertained that the child had the habit of nibbling everything within reach, including the painted wood of chairs, matches, etc. As recently as two days before the onset of symptoms, he had chewed the edge of a painted park bench.

Except for the pica, the child's past history was essentially negative. He had had the usual childhood diseases without complications. The bowels had been regular and appetite good prior to the onset of the present symptoms. The family history was irrelevant.

Examination. The child was fairly well-developed; he appeared subacutely ill, lethargic, and irritable when disturbed. There was moderate pallor of the skin, evident loss of weight, and some dehydration. The liver was palpable one finger below the costal margin. There was slight nuchal resistance and a suggestive Brudzinski sign. There was no lead line on the gums. The superficial and deep reflexes were normal. The eye grounds were normal.

Course. Blood studies shortly after admission revealed the following: hemoglobin 40 per cent; red blood cells 2,540,000; white blood cells 34,900, of which 36 per cent were polymorphonuclear neutrophiles, 59 per cent lymphocytes, 4 per cent monocytes, and 1 per cent myeloblasts. There were many macro- and microcytes, slight poikilocytosis, and polychromatophilia. Basophilic stippling of the red blood cells was marked.

The blood chemistry was normal. The CO_2 was 43.5 volumes per cent; urea 16 mg. per cent; chlorides 540 mg. per cent.

The blood Wassermann and Kahn tests were negative, as were the Schick and Pirquet tests.

The urine contained traces of albumin and an occasional white blood cell.

The blood pressure was normal.

A lumbar puncture yielded xanthochromic cerebrospinal fluid under normal pressure, containing 70 cells, of which 60 per cent were lymphocytes. The Pandy test for globulin was positive, and the total protein 130 mg. per cent. The sugar content was 90 mg. per cent.

Examination of the long bones at this time revealed no definite abnormalities (fig. 1A).

Treatment during the first three days was vigorous. Because of the persistent vomiting and dehydration, fluids were administered through all channels. Calcium was given orally, intravenously and intramuscularly.

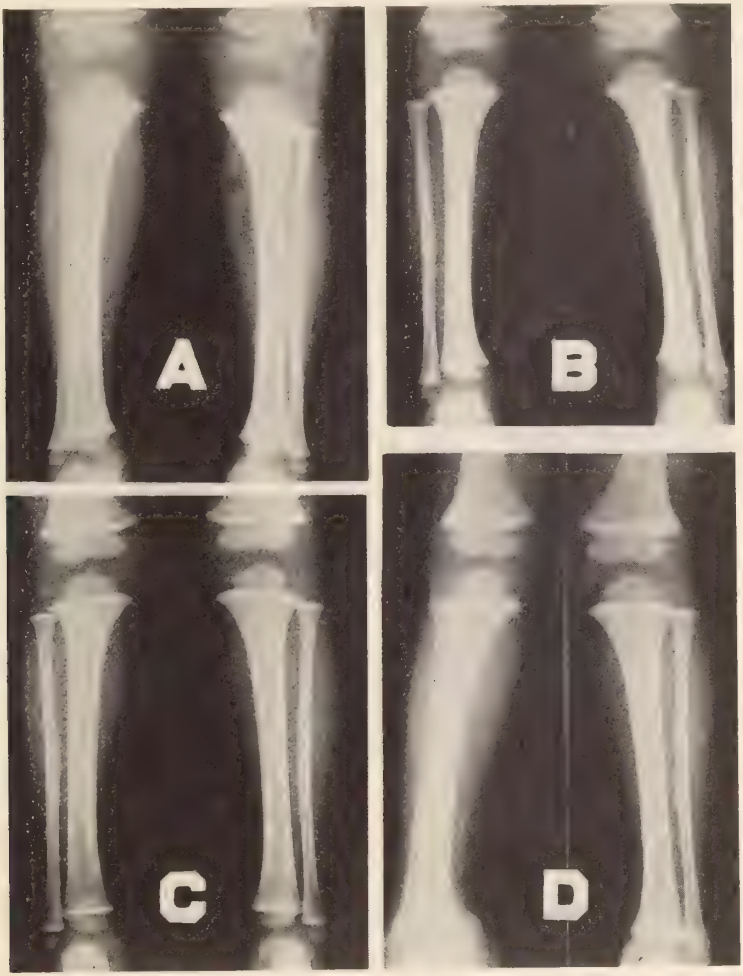


FIG. 1A. Patient on admission (8/1/31), acutely ill with symptoms of lead poisoning. The long bones are essentially normal. Although there is a suggestive widening at the metaphyseal margins, appearing in the roentgenogram as a narrow band of increased density, especially of the lower end of the femur and upper end of the tibia, no characteristic lead line can be recognized.

B. Three weeks after treatment was instituted (8/17/31). Marked improvement in the patient's condition. There is an increase in the density and width of the transverse bands at the metaphyseal margins, suggesting early lead zones.

C. Two months after admission (10/6/31). Patient ready for discharge. There is progressive widening and increased density of the lead zones.

D. Six weeks after discharge (11/25/31). Patient attending Follow-up Clinic. Condition good. Lead zones are still increasing in width and density.

The total dosage of calcium administered during the first two days in the form of calcium lactate by mouth and calcium gluconate parenterally was 21 grams. Since the child failed to respond to this treatment, sodium thiosulphate was tried in increasing doses, without noticeable effect. Stupor appeared and dehydration became more marked. A second lumbar puncture again revealed xanthochromic fluid, this time containing 200 cells with 50 per cent lymphocytes. The protein content was increased to 276 mg. per cent. On the third day, the child was transfused and 200 cc. of citrated blood were given. This was followed by a continuous intravenous infusion of glucose in Ringer's solution. A distinct improvement in the general condition resulted. The child for the first time in three days regained consciousness and began to respond to questions. The vomiting became less frequent and the dehydration less marked. The administration of calcium was continued uninterruptedly, the child receiving a daily dose of 9 gm. of calcium gluconate for one week. A daily dose of 6 gm. was continued for the following month. This was augmented by a high calcium diet, including large quantities of milk. Cod liver oil was given in the usual doses.

Response to the treatment continued to be satisfactory. Vomiting ceased, and the child gained in weight progressively. The urine, which had previously been reported positive for lead, became negative at the end of two weeks. Basophilic stippling, which had been 3 to 4 per 100 red cells on admission, dropped to 1 per 100. The hemoglobin rose from 40 per cent on admission to 60 per cent at the end of two weeks and 76 per cent at the end of two months in the hospital. The constipation and abdominal distension improved slowly. The eye grounds remained normal throughout. Renal function tests revealed no abnormalities. Bile pigment studies of the blood on one occasion revealed an indirect Van den Bergh of 1 to 100,000 equivalent to 0.3 mg., while the direct Van den Bergh was negative. The icteric index was 12 at the height of the illness. The calcium and phosphorous remained within normal limits, notwithstanding the administration of these substances. No elevation of blood pressure was noted.

X-ray examinations of the long bones were made periodically and revealed striking changes. The deposition of the lead zones under the influence of the therapy in the acute stage, and the changes which occurred during the child's stay in the hospital are well illustrated in figures 1B and 1C.

The patient remained in the hospital for two and a half months. Shortly before his return home, an attempt was made to delead him by the use of a calcium poor diet and the induction of acidosis with ammonium chloride. Vomiting promptly developed even before acidosis was apparent. It was, therefore, thought advisable to interrupt this procedure and to permit a more gradual spontaneous deleading to occur.

On October 8th, the child returned home in good condition. He had gained six pounds in weight and was apparently free of symptoms. The

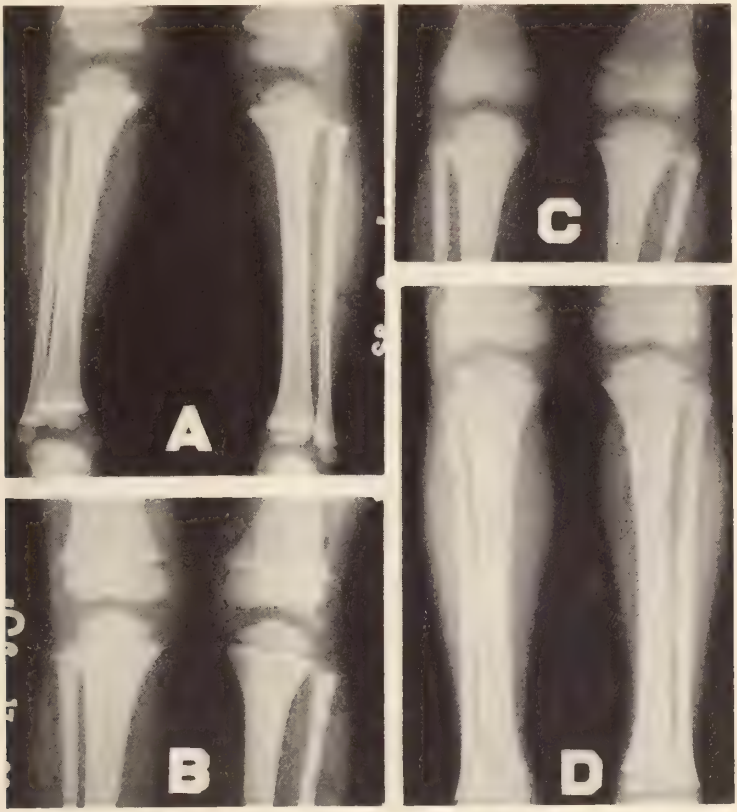


FIG. 2A. Five months after discharge (1/6/32). Patient is in hospital for attempt at deleading. Condition good. The width and density of the lead zones are most intense and are probably the result of increased growth and further deposition of lead.

B. Approximately two years after onset of symptoms (6/17/33). Patient appears well. There is a marked decrease in density and width of lead zones. A transverse line is present about 3 cm. from the distal epiphyses of femur and proximal epiphyses of tibia and fibula (poorly reproduced—well seen in original film). This probably represents the residue of the old lead zones, receded from the margin because of growth. There is still increased widening at the metaphyseal margins, indicative of lead zones, although the density and width are markedly decreased.

C. Two years and eight months after onset (4/14/34). Patient well. Transverse lines previously noted are much fainter and narrower, and have receded still farther from the epiphyseal margin. Lead zone at metaphyseal margin is now represented only by a slight increase in density and thickening.

D. Patient readmitted to the hospital (11/28/34). No symptoms of plumbism. Lead zones at the metaphyseal ends of the bones have practically disappeared. Several transverse lines (poorly reproduced) may still be seen in the original film at varying distances from the metaphyseal ends.

mother was instructed to watch for evidence of acute infections and for the reappearance of vomiting or other symptoms of lead intoxication. The boy continued to do well at home. Two months later he was readmitted for the purpose of subjecting him to a more rapid deleading. This attempt again precipitated severe vomiting, and the procedure was abandoned.

In the course of the following *three years*, the child has been seen repeatedly in the Follow-up Clinic. His growth and mental development have proceeded normally. No specific diet has been observed. Several acute upper respiratory infections have been weathered without complications. The constipation improved, and the child suffered only one severe attack of intestinal colic a year and a half ago. Basophilic stippling has been observed only on rare occasions during the past year. Examinations of the urine for lead have been repeatedly negative. The blood pressure has been normal.

Roentgenographic studies during the period of follow-up showed alterations in the lead zones, related to the advance of growth and the elimination of lead (figs. 1D, 2A, 2B, 2C).

On November 27, 1934, three years and three months after the first admission to the hospital, the child was readmitted with a history of occasional attacks of severe frontal headache during a period of six weeks. There had been occasional vertigo but no convulsions or paralyses. The child was making normal progress at school. Impairment of vision was noted recently by the school teacher.

On this admission the physical findings were negative, except for a bilateral myopia. The hemoglobin was 78 per cent; the red blood cells numbered 4,300,000; the white blood cell count was normal. There was no basophilic stippling. The urine did not contain any lead. Roentgenograms of the long bones revealed only questionable density at the metaphyseal junctions, so that without the history of plumbism, lead poisoning would not be suspected. There were several transverse lines removed from the metaphyses, which were probably the remains of the previous lead zones (fig. 2D—poorly reproduced) although there is the possibility of their being growth lines. The headaches were thought to be due to the refractive errors rather than to the lead poisoning.

COMMENT

Diagnosis. The essential features of lead poisoning are well illustrated by the two cases described. In the early stages and especially in children, gastro-intestinal symptoms predominate. Constipation, vomiting, anorexia, and abdominal pain are the common complaints. Pallor, suggestive of a variable degree of anemia, may be present. Persistent irritability, fretfulness, and nervousness may suggest plumbism in the child. In the more chronic cases, vomiting and constipation are more pronounced. Abdominal pain becomes severe. Pallor, loss of weight and weakness are

common. Pain in the extremities and twitchings of the muscles of the arms and legs have been observed. The temperature is essentially normal. In the more severe cases, symptoms referable to the central nervous system develop in the form of apathy, drowsiness, stupor, delirium, convulsions and coma. The blood pressure may be elevated. The eye grounds may show changes in the vessels, and there may appear hemorrhages, papilledema, and weakness of the eye muscles.

The development of peripheral neuritis, commonly seen in the adult with lead poisoning, is infrequent in children. The development of encephalitis, however, is more common. Of a series of 89 cases collected by McKhann and Vogt (2) during a period of nine years, there were only four cases of neuritis without encephalitis; encephalitis, however, occurred in 45 of the cases, approximately 50 per cent.

The lead line of the gums, observed in adults, is rarely found in children. This is due to the relative infrequency of pyorrhoea and organic decay, which is apparently necessary for the formation of the black lead sulphide deposits.

When the clinical history suggests the diagnosis, several valuable procedures are available for its corroboration.

Blood examination usually reveals a secondary anemia of varying severity. A leucocytosis with a moderate polynucleosis is relatively common. Basophilic stippling is seen and is usually explained by the toxic effect of lead on the young cells. Occasionally stippling of the red cells may be absent. This, however, does not exclude a diagnosis of plumbism. Especially in those cases where the lead is deposited in the bones or organs and the transport is slight, the stippled cells in the blood may be very few or absent. It has been demonstrated that the stippled cells vary in number from day to day in direct relation to the transportation of lead in the blood. They may, therefore, be used as a means of studying the progress of the case under treatment. It must be borne in mind that stippling is not characteristic of lead poisoning alone. It may be seen occasionally in acute infections such as pneumonia or in any condition associated with severe anemia. Observers have also called attention to the fact that the blood of healthy adults (3) and children (4) apparently unexposed to lead may show stippled cells. Recently stippling of the red cells was observed at The Mount Sinai Hospital in a child who had been treated with tartar emetic.

A fairly constant and important diagnostic aid are roentgenographic studies of the long bones. The characteristic changes recognized by workers independently interested in the subject, Park (5), Caffey (6), Vogt (7) and others, consist of bands of increased density at the growing ends of the long bones and at the margins of the flat bones. In Case 1, the long bones showed these changes on admission. Apparently the absorption had occurred during an appreciable length of time prior to admission. The plates are not reproduced here for reasons already mentioned. In

Case 2, the formation of the lead zones and the changes which they have undergone with growth and with the excretion of lead during the past $3\frac{1}{2}$ years are well illustrated.

The bone changes in lead poisoning are intimately related to the absorption, transportation, and deposition of lead in the body. Aub and his collaborators have demonstrated a direct relationship between calcium and lead metabolism, and have proved that the storage and elimination of these two elements from the body are influenced by common factors. It is now generally agreed that lead, whether absorbed from the intestinal tract, through inhalation, or more rarely through a break in the skin, is transported and distributed throughout the body by the blood stream, and hence is found in all of the organs. The skeleton eventually acts as a selective storehouse, since the organs gradually discharge their burden of lead into the bones. Within the bones, the lead becomes more or less localized at the growing margins. Aub (8) and others, by quantitative analysis of human and animal material, actually demonstrated the lead content at the growing ends to be much greater than that in the shaft, and proved that the lead is deposited at the expense of calcium.

The nature of the changes responsible for the increased density revealed by roentgenologic examination has been extensively investigated. Park and his associates (9) pointed out in their early studies that the closely packed bony trabeculae in the region of increased density explained the shadow. They recognized at this time, however, that lead may have been deposited in these trabeculae and thus contributed to the density. More recently, these authors concluded that the increased density is probably caused by the lead. They have also demonstrated the presence of huge giant cells and an unusual persistence of a mass of cartilaginous intercellular substance. Chemical studies have shown that lead and calcium are deposited in this intercellular substance. A lowering of osteoblastic activity due to the action of lead is considered the cause of its persistence.

It has been demonstrated that the lead deposited at the metaphyseal margin of bone follows the line of growth. The rate of growth at a given metaphyseal margin, therefore, influences the amount of lead deposited. This explains the variations in the width of the lead zones seen at the metaphyseal margins of the various long bones of the body. A correlation of the width of the lead zones with the rate of growth will permit an estimate of the duration of the process.

The lead zones undergo changes during the elimination of the metal. When ingestion of the lead has ceased, these changes take place slowly. Under ordinary circumstances, small amounts of lead are reliberated from the skeleton and circulated in the blood stream. Part of this is excreted by way of the intestinal tract and in the urine; the remainder is redeposited in the growing bone. This explains the increasing width of the lead zones at the growing margins of the bones after extraneous sources of lead have

been excluded. The appearance of the lead zones thus varies with growth and excretion. In some instances the bands may become broader, but less dense and less sharply defined, and the end of the shaft may even exhibit two distinct bands separated by an intermediate zone. Eventually a narrow transverse line may mark the site of a previous band of lead density. Repeated roentgenological examinations throughout a long period reveal the changes in the lead zone through the entire period of elimination. In cases of acute lead poisoning, X-ray films may not reveal the lead zone until several weeks have elapsed. This is due to the rather gradual accumulation of the freely circulating lead in the bones. After the fifth year, the development of lead zones at the growing ends of the long bones is not a reliable aid in diagnosis, and is practically of no significance in the adult.

These dense bands at the ends of the long bones are, however, not peculiar to lead poisoning alone. The ingestion of phosphorus (10), bismuth, and other substances may produce similar bands. Zones of increased density at the metaphyseal margins of the rapidly growing ends of the long bones may occasionally be seen in normal children over two years of age. Such zones may also be seen in healing rickets or in children treated with viosterol. The lines due to lead, however, are usually of greater density and wider. Repeated X-ray examinations in the course of two or three months will reveal broadening of the zones. When the increased density is due to calcium, the bands are not widened with the advance of time. In scurvy and syphilis, the dense bands observed are irregular and are seen only at the ends of the bones.

Additional proof of lead ingestion may be obtained by *X-ray examination of the abdomen.* Opaque fleck shadows may point to the presence of lead in the intestinal tract (11). *Spectroscopic examination* (12) of the blood for lead is also a valuable diagnostic aid. A method has recently been devised whereby an accurate diagnosis of pathological amounts of lead in 0.1 cc. samples of peripheral blood can be made within 30 minutes (12).

The demonstration of *lead in the stools and urine* is of diagnostic value if properly evaluated. Quantitative determinations are important. Kehoe (13) and others have shown that normal adults will after a time establish a daily lead balance, so that the output of lead in the excreta will be equivalent to its intake. In the adult, this amounts to about 0.25 mg. daily. Normal children have similarly been shown to eliminate small amounts of lead in the excreta. Since in the study of a given case it is difficult to tell how much of the lead present in the stools is due to unabsorbed lead and how much to eliminated lead, it is important to follow the urinary output, this being a better indicator of the progress of the case.

In cases with manifestations of cerebral involvement, changes in the *cerebrospinal fluid* are often observed. They are, however, not pathognomonic. The fluid may be clear and colorless, under increased pressure,

and may show a positive globulin test. Not infrequently, as in our second case, it may be xanthochromic. The total protein may be increased, and pleocytosis is common, although the cell count may be normal.

Pathology. The pathology of lead poisoning is not specific. The characteristic lesions are often described as hemorrhages followed by fibrosis, both conditions being attributed to the action of the lead on the vessels, especially the minute vessels. Similar changes, however, have been noted in anemias not due to lead poisoning. Lesions in the central nervous system have been studied in great detail because of the marked affinity of lead for nervous tissue, precipitating grave cerebral symptoms in children. The brain has been variously described as shrunken with flattened convolutions, pale, and firm. This is particularly true of the chronic cases. Attention (14) has been directed to disseminated hemorrhages in the perivascular spaces. Hassin (15) in his important contribution demonstrated that the brain in uncomplicated lead encephalitis reveals a preponderance of proliferative changes in the mesodermal tissues. This involves the pia-arachnoid and to a lesser extent the parenchyma. In the pia-arachnoid, marked proliferation of fibrous tissue and blood vessels may be found, especially near the cerebellum, the optic chiasm, and the temporal lobes. The brain parenchyma proper may show glia cell proliferation, progressive changes in the endothelial and adventitial cells, and formation of new capillaries. It is of interest that the perivascular infiltrations so common in the infectious encephalitides are strikingly absent in lead encephalopathy. In the more acute cases, an inflammatory-like lesion characterized by infiltration with lymphocytes and plasma cells may be found in the brain substance.

Weller and Christensen (16) observed intense cerebral edema in the histopathology of lead encephalitis in experimental animals. These observations were confirmed by McKhann and Vogt. It is assumed today that the entire symptomatology of the so-called lead encephalitis may be due to increased intracranial pressure as a result of cerebral edema. The degeneration of brain substance, which has been demonstrated by some, has been explained as the probable effect of impaired circulation of the brain during the period of cerebral edema. It has been shown, however, that lead can be deposited in the brain so as to directly injure the cells.

Prognosis. In cases of lead poisoning before cerebral symptoms set in, the course of the disease may be influenced favorably by active therapy. The development of cerebral symptoms contributes toward a grave prognosis. Of the 45 cases of lead poisoning with cerebral symptoms reported by McKhann and Vogt, 11 died and 12 showed permanent sequelae in the form of persistent convulsions, cerebral atrophy, tremors, mental retardation, muscular weakness, blindness, and speech defects. The mortality in cases of lead encephalopathy has been variously estimated at from 25 to 75 per cent. Death usually follows a period of coma or convulsions and is generally attributed to respiratory failure.

Treatment. The successful treatment of lead intoxication rests upon the understanding of certain fundamental chemical concepts which have been developed by Aub and his coworkers. After lead is absorbed, it combines with phosphorous and is carried in the blood to the various organs, especially the brain, liver, pancreas, and the skeleton. During this transportation it exists as a relatively soluble *dilead phosphate.* The question as to whether this is an organic or an inorganic phosphorous compound is still undecided. It is this divalent lead compound which is believed to be responsible for the toxic symptoms. In the viscera, before it is discharged to the bones, the lead may induce symptoms referable to the organ affected. The bones, as the selective reservoir for the lead, store it in an inert, relatively insoluble form—the tertiary lead phosphate, which is localized essentially in the regions described as lead zones.

It has already been pointed out that lead behaves exactly like calcium in its absorption, transportation, deposition, and excretion. The factors which influence the storage of calcium in the bones have been shown to have a similar effect on lead. During the acute stage, treatment must be directed to the removal of the lead from the blood stream into the bones. Aub and his co-workers have suggested that this can be accomplished by a high calcium diet, including milk and the administration of calcium salts. In the opinion of Shelling (17) such a diet has a high phosphorous content. He offers experimental data to show that this is the important factor in the therapy. Viosterol is usually given as an adjuvant to the treatment although it is considered unnecessary by some.

In the milder cases, the cessation of lead ingestion is usually sufficient to effect clinical improvement. The sensitiveness of the tertiary lead phosphate in the bones to changes in the hydrogen ion concentration is an important factor in the elimination of lead from the body. When the hydrogen ion concentration is altered to a point sufficiently acid or alkaline to increase the solubility of the lead phosphate, the latter enters the blood stream and elimination can be accomplished. This is of particular significance in latent lead poisoning, where, under the stress of an acute infection or acidosis, toxic manifestations may appear in patients in whom the lead would otherwise remain undetected in the bones.

Controlled elimination of lead has been successfully affected by the use of phosphoric acid or acid salts such as ammonium chloride, enhanced by a calcium poor diet, or by the use of parathyroid hormone (18). More recently Gray (19) reported success in the use of low calcium, high phosphorous diets in the deleading of patients with subacute or chronic plumbism. The use of alkalies with a normal diet also is effective, although the results are not as striking as those produced by acid salts and a low calcium diet.

Too rapid elimination of lead in the blood stream has its dangers. The occurrence of cerebral symptoms constitutes a serious complication, so

that some authors no longer attempt to delead and depend on avoiding acute infections or an acidotic state, while excretion of the lead proceeds at a low level. In our Case 2, two attempts at deleading were abandoned because of the recurrence of severe vomiting. It is also true that if deleading is not vigorously pursued, there is a strong probability of recurrence of symptoms. However, with the gradual spontaneous elimination of lead, recurrence of symptoms is less likely.

It is necessary to emphasize the fact that an early diagnosis is essential, so that active therapy may be begun before cerebral symptoms have set in. This is well demonstrated by Case 1, where convulsive seizures had already developed, and therefore therapy could not prevent a fatal issue.

The striking susceptibility of infants and children to lead intoxication necessitates the removal of all sources of the substance. This is especially true during the teething period, when there is a common tendency to mouthe whatever can be grasped. Perversion of appetite, known as pica, is observed in the majority of cases of lead poisoning, as was the fact in the two cases presented here. There has been considerable discussion as to whether pica is an advanced stage of a bad habit, or whether it is part of the symptomatology of lead poisoning. In any event, its detection may often prevent grave consequences. Lead nipple shields, lead water pipes, painted toys and cribs have in the past been frequently reported as sources of the lead.

REFERENCES

(1) Aub, J. C., Fairhall, L. T., Minot, A. J., and Reznikoff, P.: Medicine Monographs. Baltimore, Williams & Wilkins, Vol. 7, 1926.

(2) McKhann, C. F., and Vogt, E. C.: Lead Poisoning in Children. J. A. M. A., 101: 1131, 1933.

(3) Nelson, W. T., Lockwood, L., and Mackay, K.: The Incidence of Punctate Basophilia. Med. J. of Australia, 19: 317, 1932.

(4) McDonald, S. T.: The Minor Manifestations of Plumbism in Childhood. Med. J. Australia, 17: 806, 1930.

(5) Park, E. A.: In discussion of McLean, Stafford: The Bone Lesions of Congenital Syphilis. Am. J. Dis. Child., 39: 905, 1930.

Park, E. A., Jackson, D., and Kajdi, L.: Shadows Produced by Lead in X-ray Pictures of Growing Skeleton. Am. J. Dis. Child., 41: 485, 1931.

(6) Caffey, I. P.: Clinical and Experimental Lead Poisoning—Some Roentgenologic and Anatomic Changes in Growing Bones. Radiology, 17: 957, 1931.

(7) Vogt, E. C.: A Roentgenologic Sign of Plumbism. Am. J. Roentgenol., 24: 550, 1930.

Ibid.: Roentgenologic Diagnosis of Lead Poisoning in Infants and Children. J. A. M. A., 98: 125, 1932.

(8) Aub, J. C., Robb, G. P., and Rossmeisl, E.: The Significance of Bone Trabeculae in the Treatment of Lead Poisoning. Libman Anniversary Volumes, 1: 95, 1932.

(9) Park, E. A., Jackson, D., Goodwin, T. C., and Kajdi, L.: X-ray Shadows in Growing Bones Produced by Lead; their Characteristics, Cause, Ana-

tomical Counterpart in the Bones and Differentiation. J. Pediat., 3: 265, 1933.

(10) Phemister, D. B.: The Effect of Phosphorous in Growing, Normal and Diseased Bones. J. A. M. A., 70: 1737, 1918.

(11) McKhann, C. F.: Lead Poisoning in Children the Cerebral Manifestations. Arch. Neurol. & Psychiat., 27: 294, 1932.

(12) Shipley, P. G., Scott, T. F. M., and Blumberg, A.: The Spectroscopic Detection of Lead in the Blood as an Aid to the Clinical Diagnosis of Plumbism. Bull. Johns Hopkins Hosp., 51: 327, 1932.

Blumberg, H., and Scott, T. F. M.: A Thirty-Minute Spectrographic Micro-Method for the Detection of Pathological Lead in Peripheral Blood. Bull. Johns Hopkins Hosp., 56: 32, 1935.

(13) Kehoe, R. A., Thamann, F., and Cholak, J.: Lead Absorption and Excretion in Infants and Children. J. Indust. Hyg., 15: 301, 1933.

Ibid.: Normal Absorption and Excretion of Lead. J. A. M. A., 104: 90, 1935.

(14) Courtney, J. W.: A Case of Multiple Cerebral Hemorrhages from Chronic Lead Poisoning with Necropsy. Bost. M. & S. J., 142: 136, 1900.

Legge, T. M., and Goadby, K. W.: Lead Poisoning and Lead Absorption. New York, Longmans, Green & Co., 1912.

(15) Hassin, G. B.: The Contrast between the Brain Lesions Produced by Lead and other Inorganic Poisons, and those caused by Epidemic Encephalitis. Arch. Neurol. & Psychiat., 6: 268, 1921.

(16) Weller, C. V., and Christensen, A. D.: The Cerebrospinal Fluid in Lead Poisoning. Arch. Neurol. & Psychiat., 14: 327, 1925.

(17) Shelling, D. H.: Effect of Dietary Calcium and Phosphorous on Toxicity of Lead in the Rat; Rationale of Phosphate Therapy. Proc. Soc. Exp. Biol. & Med., 30: 248, 1932.

(18) Hunter, D., and Aub, J. C.: The Effect of Parathyroid Hormone on the Excretion of Lead and Calcium in Patients Suffering from Lead Poisoning. Quart. J. Med., 20: 123, 1927.

(19) Gray, I.: Recent Progress in the Treatment of Plumbism. J. A. M. A., 104: 200, 1935.

ABSTRACTS

Authors' Abstracts of Papers Published Elsewhere by Members of The Mount Sinai Hospital Staff

Pericapillary Encephalorrhagia Due to Arsphenamine. Joseph H. Globus and Sol Ginsburg. Arch. Neurol. & Psychiat. 30: 1226, December, 1933.

The authors present two cases of so-called arsphenamine encephalitis, one in a case of syphilis, the other in a case of acute multiple sclerosis. Both cases showed perivascular hemorrhages of the type usually described under the term of ring hemorrhages, due to rupture of the smaller capillaries, and moderate reactive gliosis in response to the toxic substance. The hemorrhagic lesions bore no relation to the underlying disease.

The literature is reviewed with regard to frequency, etiological factors and histopathological features in this syndrome.

Relationship between Lupus Erythematosis and Tuberculosis. Harry Keil. Arch. Dermat. & Syph. 28: 765, December 1933.

The actual incidence of active tuberculosis in cases of lupus erythematosis as judged by modern pathologic criteria leads the writer to conclude that the relationship between these diseases is coincidental, that there is no justification for the assumption of active tuberculosis merely because the patient suffers from lupus erythematosis, and finally that these patients do not eventually succumb to active pulmonary tuberculosis except in rare instances in which cause and effect have not been reasonably demonstrated.

The Effect of Adenosine on Cardiac Irregularities in Man. A. Jezer, B. S. Oppenheimer and S. P. Schwartz. Am. Heart J. 9: 252, December 1933.

It was found that in paroxysmal auricular flutter and in paroxysmal auricular fibrillation adenosine increased the grade of auriculoventricular block lasting from 40 to 60 seconds, but did not abolish the abnormal rhythm. In paroxysmal tachycardia of auricular origin it was found that the drug temporarily abolished the ectopic rhythm in one case but was ineffective in restoring sinus rhythm in a second case. In paroxysmal tachycardia of supra-ventricular origin, it was found that the drug had no effect on the rate or the rhythm of the heart.

Ventricular standstill for periods of from 1 to 9.2 seconds followed the administration of the drug in cases of abnormal rhythm of auricular origin. During these periods the patients experienced giddiness, faintness and precordial pain which disappeared with the return of the ventricular contractions.

Adenosine is of doubtful therapeutic value in the paroxysmal tachycardias of auricular origin and of no therapeutic value in the other ectopic rhythms which were studied.

Some Cutaneous Manifestations of Endocrine Disorders. Oscar L. Levin. Med. J. & Rec. 138: 420, December 1933.

The cutaneous changes that have been observed in disorders of the endocrine glands are classified in three main groups:

A. Those concerned with the changes due to dysfunction of individual glands; these are associated with texture, color, pigmentation, hair growth and formation of growths.

B. Those concerned with the accepted clinical entities of disorders of the endocrine glands; among them are myxedema, Graves' disease, acromegaly, Froehlich's syndrome, Addison's disease, V. Recklinghausen's disease, Gaucher's disease, and pluriglandular syndromes as the thymo-pituitary-suprarenal syndrome of Timme.

C. The third group is composed of changes in which disorder of the endocrine glands have been reported as possible causative factors; they include acne vulgaris, erythemia, urticaria, angioneurotic edema, tinea capitis, psoriasis, scleroderma, Raynaud's disease, cyanosis, pruritus, leg ulcers, rosacea, nephrosis, menstrual herpes, impetigo herpetiformis, hypertrichosis, and alopecia.

The Arterial Blood Vascular Distribution to the Left and Right Ventricles of the Human Heart. Louis Gross and M. A. Kugel. The Am. Heart J. 9: 165, December 1933.

By means of a new technic whereby it is possible to study the vascular distribution in the myocardium and to compare unit areas in the left and right ventricle, it has been definitely demonstrated that early in life there is a right ventricular vascular predominance, that there soon follows an equalization of the vascular supply which lasts for approximately one decade, and thereafter the left ventricular myocardium assumes an increasing preponderance in its vascular bed over that of the right. It has also been shown that, particularly after the third decade in life, the septal anastomoses increase very conspicuously in their extent.

A Note on the Psychology of the Inventor. Sandor Lorand. The Psychoanalytic Quarterly 3: 30, January 1934.

The analysis of a young man in his thirties, who has devised numerous inventions, is presented. The patient obtained his first patent for an electrical invention at the age of fifteen.

It becomes evident from the case history that besides the constitutional element there were outstanding psychogenic factors responsible for the development of the ability of invention. Manifest in the patient's life was his early preoccupation with sexual curiosities; *seeing* and *hearing* were the two important factors. Thus his eyes and ears were the two strong libidinal organs.

In addition, early childhood sufferings, in the sense that he was often left alone and that he had to invent ways in which to amuse himself, also led him to inventions. The various forms of masturbatory activities which he invented to achieve gratification were also factors in the development of his creative abilities.

It is evident from the case presented that invention for this patient was playing his way through life (he always referred to his inventions as play). Thus, through play he was supported and taken care of. He achieved this by always finding a partner who financed him and took care of the material end of the invention.

Sinusitis in Chronic Arthritis. S. Fineman, R. G. Snyder and C. H. Traeger. Arch. Otolaryng. 19: 23, January 1934.

A routine stereoscopic roentgenologic study of the paranasal sinuses was made in 386 ambulatory cases of chronic arthritis. In 93 cases, rhinologic examination confirmed the roentgenologic evidence of sinusitis. Seventy-seven of the ninety-three patients were unaware that they harbored sinus infection. Treatment of the sinusitis, even when asymptomatic, was an important factor in the management of these cases of chronic arthritis and almost invariably aided in the clinical improvement of the patients.

Coronary Thrombosis: Perforation of the Infarcted Intraventricular Septum. Robert V. Sager. Arch. Int. Med. 53: 140, January 1934.

A review of seventeen reported cases of perforation of the infarcted intraven-

tricular septum shows that the condition is chiefly characterized by a combination of the symptomatology of coronary thrombosis and the well known physical signs of perforation of the intraventricular septum. Guided by this concept, the author's case was diagnosed before death. The autopsy findings are presented with a discussion of the anatomical and clinical details.

Disruption of Abdominal Wounds. Ralph Colp. Ann. Surg. 99: 14, January 1934.

Wound dehiscence occurred in 9 per cent of a series of 2,750 consecutive cases. It seemed to affect men slightly more than women. Age, anesthesia, type of incision, magnitude of the operation, and method and technic of wound closure, drainage or wound infection, bear little or no relationship to its frequency. It appeared to be more frequent in carcinoma, certain gynecological conditions and those maladies characterized by chronic toxaemia and accompanied by anaemia, cachexia, weakness and general debility. The crux of the problem seemed to rest in the failure of the regenerative powers of the tissues to promote firm healing. The treatment seems to be divided between tamponade and secondary suture. The mortality is 28 per cent, and appears more dependent upon the fundamental disease rather than the wound dehiscence itself. Wound dehisence will never be an unavoidable surgical complication until methods are available to accurately differentiate those patients with poor reparative powers, and until means are at hand which will unfailingly promote the prompt healing of tissues in these specific areas.

Treatment of Obesity in a Group of Children. Anne Topper and Hanna Mulier. Am. J. Dis. of Child. 47: 25, January 1934.

This paper presents the treatment of 25 children with exogenous obesity. Treatment consisted of measures to insure:

1. A low caloric diet to force the body to use its own stores.
2. A high protein content (40 per cent) to stimulate growth and metabolism.
3. Reduction of salt and water.
4. Increased physical activity to stimulate metabolism.

The treatment resulted in a satisfactory rate of weight loss, a normal growth increase, better eating habits, and an increased capacity for physical and mental activities.

Absence of Effect of Antuitrin-S Injection on the Immature Ovary. Samuel H. Geist. Pro. Soc. Exper. Biol. & Med. 31: 434, January 1934.

Two infants ill with tuberculous meningitis, one of ten months, and one of eighteen, were injected with Antuitrin-S, an anterior pituitary-like hormone. Twenty-five hundred rat units divided into five doses over a period of ninety-six hours were given. No evidence, macroscopically or microscopically of follicular maturation or luteinization was present in the ovaries and the uterine mucosa was normal.

Apparently the anterior pituitary-like hormone failed to produce changes in the immature human ovary and likewise in the uterine mucosa.

Bacillus Proteus Osteomyelitis of the Spine. Seth Selig. J. Bone & Joint Surg. 16: 189, January 1934.

A case of metastatic hematogenous infection of the bodies of two adjacent cervical vertebrae during the course of a bacillus Proteus bacteremia following cystoscopy is reported. After prolonged immobilization in a plaster cuirasse recovery took place with solid, bony fusion of the two diseased vertebrae. At no time was there evidence of suppuration.

Observations on Individual Sensitiveness to Pain. Emanuel Libman. J. A. M. A. 102: 335, February 1934.

After describing a method for determining sensitivity to pain, a description is given of the "substitution" and "covered" symptoms in the hyposensitive individual. The subjects of tolerance, sensitization and desensitization are briefly described. Irregular radiations are described and the value of induced sensitization. Finally, there are taken up visceral disturbances in the hyposensitive, the sensitivity of muscles, and the Mackenzie view of hyperalgesia.

Anxiety as a Medical Problem. Sandor Lorand. New York State J. M. 34: 92, February 1934.

On the basis of a study of a case of anxiety neurosis the problem of anxiety in general, as it occurs in patients in the physician's office, is discussed. That anxiety is present in all of us and that it has its origin in early childhood are two of the points stressed. In the present-day struggle, the external economic factors have added greatly to the causation of neurotic anxiety states; hence persons of weaker psychologic make-up, who seemed to be fairly well adjusted, could no longer cope with the additional burden.

In connection with the case presented a psychoanalytic approach was made in the understanding of the relationship existing between early childhood anxiety and adult anxiety neurosis. It was pointed out that anxiety neurosis is most amenable to therapy. Even if the classical method of psychoanalysis is not employed, any kind of psychotherapy might be found useful.

The most important factor in the elimination of anxiety is the basic understanding of the patient's whole life situation, especially of his early childhood adjustment or maladjustment.

The fact that anxiety is present to a minor degree in all of us helps us to understand how the anxiety states develop. That is why it becomes more comprehensible to us than other neuroses.

Carcinogenesis. A Line of Research. Moses Benmosche. Virginia Medical Monthly 60: 671, February 1934.

The author attempts to correlate three established facts into a workable hypothesis.

1. The increase of potassium in non-necrotic malignant tissue.
 (a) The demonstration of Zwardemaker that potassium is indispensable for life.
 (b) The isolation of the isotope of potassium and the definite demonstration of its radioactive properties.
2. The association of lymphatic stasis with malignancy.
 (a) The classical histologic researches of Sampson Handley on lymph stasis as a precancerous condition.
 (b) Cancer metastasis by lymphatic permeation.
3. The carcinogenetic property of radioactive agents.
 (a) Carcinogenetic property of X-ray, radium, coal-tar and allied agents. The thesis carries with it the suggestion that the normally present endogenous radioactive isotope of potassium, under specific conditions, may act as a specific carcinogenetic agent, and this, through the lymphatic system.

Histology of the Coronary Arteries and their Branches in the Human Heart. Louis Gross, Emanuel Z. Epstein and M. A. Kugel. Am. J. Path. 10: 233, March 1934.

There has been presented in this report a description of the main coronary arteries

of the human heart as well as of the myocardial arteries, arterioles and capillaries, as represented in six different areas in the heart (standardized blocks). The description particularly concerns itself with the age period changes that these vessels undergo. It is demonstrated that the main coronary vessels present a succession of progressive changes in the intima, media and adventitia.

A discussion is given of the peculiarities of each of the main coronary arteries as well as of the smaller vessels in different sites of the heart. It appears that these individual peculiarities may play a functional rôle in the nutrition of the myocardium.

Dislocation of the Cervical Vertebrae. David Warshaw. Ann. Surg. 99: 470, March 1934.

In this article the author discusses the subject of dislocation of the cervical vertebrae and reviews the literature. He reports a case of bilateral forward dislocation of the sixth cervical vertebra, in which he was able to effect a perfect reduction with complete recovery. The patient was able to leave the hospital a few days after the operation, without the necessity for immobilization.

Recession of the Levator for Lagophthalmos in Exophthalmic Goitre. Isidore Goldstein. Arch. Ophth. 68: 389, March 1934.

This method corrects the defective closure of the lids in the exophthalmos of Graves' disease. The procedure is in many respects similar to that used in resecting the levator muscle. The operation may be performed through the conjunctiva or from the skin surface. In all, eight operations were performed on five patients. Where exophthalmos is unilateral it may be necessary to make minor adjustments to match the fellow eye. The operation results uniformly in better closure of the lid.

The Differentiation of Acute Coronary Thrombosis from Pulmonary Embolization. Samuel Averbuck. Am. J. M. Sc. 187: 391, March 1934.

Pulmonary embolus may be the cause of a clinical picture indistinguishable from the syndrome of acute coronary artery occlusion. Six cases illustrating the difficulties of this problem in differential diagnosis are presented. Some points of possible aid in the differentiation are discussed.

The Metastasis of Melanoma to the Groin Four Years Before the Appearance of the Primary Lesion on the Heel. Seth Selig. Am. J. Cancer 30: 94, March 1934.

A non-pigmented, radio-resistant melanoma of the right heel, metastasizing to the groin four years before the primary growth was visible is reported. The early metastasis which was widely resected, may have been due to the constant trauma to which the growth was subjected because of its location. Death occurred in seven years.

Globulin Extract of Immune Adult Serum in Prophylaxis of Measles. Samuel Karelitz. Proc. Soc. Exp. Biol. & Exp. 31: 793, April 1934.

a. The globulin fraction of the blood of measles immune adults carries with it a factor effective in measles prophylaxis.

b. This globulin extract is at least as effective as the blood serum from which it was obtained.

c. Although no direct proof is offered, suggestions are made which might explain the striking results obtained in measles prophylaxis with placental globulin extract, on the basis of the maternal and fetal blood contained in the placenta.

Cystic Schwannoma of the Sacral Plexus. Robert T. Frank. Am. J. Obst. 27: 593, April 1934.

A woman of 30, who showed the symptoms of v. Recklingshausen's neurofibromatosis with an unlocalized lower chronic cord lesion, was operated upon for a cystic pelvic tumor. This tumor proved to be a thin walled cyst intimately connected with the 5th lumbar, first and second sacral nerves. Convalescence was uneventful. The cyst wall contained nervous tissue (palisaded nuclei of glial origin)—a cystic Schwannoma. The patient has since become pregnant. Sixteen cases of pelvic neurofibroma, solid or cystic, were found in the world's literature.

Electrocardiographic Evidence of Cardiac Involvement in Acute Disease. A. M. Master and H. Jaffe. Proc. Soc. Exp. Biol. Med. 31: 931, May 1934.

Daily electrocardiograms were taken on patients suffering from acute disease who received no digitalis. These were contrasted with a control series, mainly acute rheumatoid arthritis, in whom no significant changes were found, although many were acutely ill with fever.

Rheumatic fever presented the most numerous changes, including heart block and arrhythmias. However, in typhus fever, lobar pneumonia, and typhoid fever, striking prolongation of the P-R interval occurred in the former two, usually at crises. T-wave changes were frequent in acute disseminated lupus erythematosis, periarteritis nodosa, Malta fever, capillary toxicosis, bronchopneumonia and typhoid fever. A common pathologic alteration of vascular nature was therefore suggested, forming possibly the basis of permanent heart damage.

A few cases of gonococcal arthritis and most cases of tuberculosis with tachycardia showed changes.

Little evidence of myocardial damage was found in erythema multiforme and erythema nodosum; hence their relation to rheumatic fever is probably remote.

The Precordial Lead in 104 Normal Adults. Arthur M. Master. The Am. Heart J. 9: 511, May 1934.

The chest lead has become a useful adjunct in cardiac work and hence the "precordial" electrocardiogram is discussed and a simple glass funnel electrode is described for use in this new lead. The P-Wave (auricular) is usually negative. The QR group is always diphasic and never notched. The absence or the low amplitude of a Q-wave or an R-wave is definitely abnormal. The R-T transition is always below the isoelectric. The T-waves are always inverted, hence a positive T-Wave is an abnormal finding in the precordial lead.

Measurement of Circulation Time from Antecubital Vein to Pulmonary Capillaries William M. Hitzig. Proc. Soc. Exp. Biol. and Med. 31: 935, May 1934.

A measure of the circulation time from the antecubital veins to the pulmonary capillaries may be obtained by introducing intravenously a mixture of ether and saline and recording the time that elapses before the odor is perceived by either patient or investigator. In 100 "normals," without evidence of circulatory disturbance, the circulation time varies between $3\frac{1}{2}$ and 8 seconds. In right ventricular failure the "ether time" is invariably prolonged, whereas in left ventricular failure it is usually within normal limits. The normal percentage relationship of "ether" to "saccharin time" is presented and the value of such comparative studies in heart failure is discussed.

The Incidence and Treatment of Trichomonas Vaginalis in Pregnancy. Oscar Glassman. J. A. M. A. 102: 1748, May 1934.

The author found that 20.7 per cent of pregnant patients, personally examined at the Berwind Maternity Clinic, harbored the trichomonas. This agrees with other reports which are given. The pathogenicity, symptoms, and method of diagnosis are

discussed. The numerous treatments are mentioned and his own method of treatment is described, in which he uses a crystalline phenol in a boric acid base. Microscopic examination of the vaginal secretion is urged as well as further study of this flagellate.

Skeletal Muscle Sarcoma. Edgar M. Bick. Ann. Surg. 99: 949, June 1934.

The two most common types of skeletal muscle tumors are haemangiomata and sarcomata. According to the material studied, these two appear with approximately equal frequency. 35 cases of skeletal muscle sarcomata were collected from hospital case records. The sites of predilection were found to be the thigh, abdominal wall, and forearm. Pain was rarely an early or outstanding symptom. Duration was less than 1 year in all cases but one. Malignancy varies as it does in all fibrosarcoma; metastasis through the blood vessels is the rule, hence enlarged lymphnodes are not found. Therapy consists in radical excision in all cases. This should be followed by deep radiation in spite of the fact that these tumors have a high degree of radio resistance.

Members of the hospital staff and the out-patient department of The Mount Sinai Hospital are invited to submit for publication in this column brief abstracts of their articles appearing in other journals.

VOLUME II SEPTEMBER-OCTOBER, 1935 NUMBER 3

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

SPONTANEOUS VARIATIONS IN VENTRICULAR RATE IN COMPLETE HEART BLOCK

ERNST P. BOAS, M.D.

[*Service of Dr. George Baehr*]

Two years ago I published brief observations (1) to show that in patients with complete heart block there is a variation in ventricular rate in response to exercise, sleep and other influences which is analogous to and, expressed in percentage change in rate, is of the same order of magnitude as the change in sinus rhythm under similar circumstances. Subsequently Gilchrist (2) made an exhaustive study of this phenomenon. He showed that the intravenous administration of $\frac{1}{30}$ grain of atropine sulphate induced a rise in ventricular rate of from 1.2 to as high as 47 beats a minute, and that the higher the initial ventricular rate, the greater the acceleration. Adrenalin, too, accelerated the ventricles in complete heart block, but in this instance the higher the initial rate the less was the acceleration. In a final study he demonstrated that in patients with complete heart block the ventricular rate measured on successive days is not a fixed quantity, but that it varies from day to day, and that the range is peculiar to the individual. The highest range that he observed was 10.7 beats per minute; the lowest 0.3. He further observed an increase in ventricular rate following exercise which in one patient amounted to 50.2 beats a minute. Similar increased ventricular rates occurred with fever induced by the intravenous administration of typhoid vaccine. During sleep there was a fall in the ventricular rate. Gilchrist concludes that the idioventricular center responds much as does the sino-auricular node to the many influences that may affect the heart.

His presentation is so complete that it is unnecessary to elaborate the subject. I wish to present three cases of complete heart block, with observations of change in ventricular rate during sleep, after exercise and after meals, as well as of spontaneous alterations in rate. Most of the pertinent literature will be found in Gilchrist's papers. I add only those references that do not appear in his bibliography.

In 1906 Rihl (3) produced vagus slowing of the ventricles in dogs with complete heart block. Volhard (4) in 1909 reported two patients with

complete heart block in one of whom the ventricular rate was 68 in recumbency and 22 standing. In the other the rate rose from 20 to 30 after atropine administration. He interpreted these findings as indicative of vagus action on the heart. Josué and Godlewsky (5), Zander (6), Wilson and Robinson (7), and Campbell and Suzman (8) reported cases of ventricular acceleration after exercise in patients with complete heart block. Hecht (9), Hart (10), Wilson and Robinson (7), Bloch (11) and de Graff and Weiss (12) noted ventricular acceleration in complete heart block after the administration of atropine. In Simici's case (13) the ventricular rate increased after atropine, adrenalin and after exercise.

It is astonishing that in the face of so many observations (and many additional cases are listed in Gilchrist's papers), the view should still be prevalent that the ventricular rate in complete heart block is constant and uninfluenced by the extracardiac nerves. It is true that Lewis (14) states that in "clinical cases of complete heart block the idioventricular rhythm is uncontrolled by the vagus, but in some patients, especially young patients, it is controlled in some degree".

CASE REPORTS

Case 1 (H. N. 325871). A man, 78 years of age, was admitted to the hospital for dyspnea and edema of the ankles. Eight years previously he had complained of dyspnea, palpitation and substernal pain, and high blood pressure had been discovered. Three years previously he began to have repeated fainting attacks, which had persisted until six months before his admission. He had known for one year that his pulse rate was slow.

He was not acutely ill. There was marked enlargement of the left ventricle. The heart sounds were of good quality. The heart rate was 26 and regular, the blood pressure 220 systolic and 60 diastolic. The liver was felt one finger-breadth below the costal margin; the lungs were clear. The Wassermann reaction of the blood was negative. The electrocardiogram (fig. 1) revealed complete heart block, with an auricular rate of 80 and a ventricular rate of 27. There was also intraventricular block. During his stay in the hospital he was quite comfortable; the pulse remained regular; and he received no medication.

His heart rate was studied by means of the cardiotachometer (1). Figure 2 is a chart representing the variations in heart rate which was continuously recorded for one hour. Even at rest the ventricular rate varied as much as 6 beats a minute. An effort to promote emotional acceleration of the heart was unsuccessful. Walking up 14 steps raised the rate on one occasion from 24.5 to 28, on another from 26 to 29. After supper the rate rose from 26 to 29. Table 1 presents an almost continuous record of the ventricular rate during the night. Each heart beat was automatically registered on an electromagnetic counter. The total beats between readings, divided by the time elapsed, gives the rate.

The ventricular rate before retiring was 24. During the first half hour of sleep it was quite labile rising as high as 29. In the following hours there was a gradual diminution in rate, until a minimum of 18 was reached about 5 hours after he fell asleep. The rate then ranged between 21 and 24, to reach a second minimum of 18 not quite two hours later. On two occasions coughing produced a slight increase in rate. These variations of

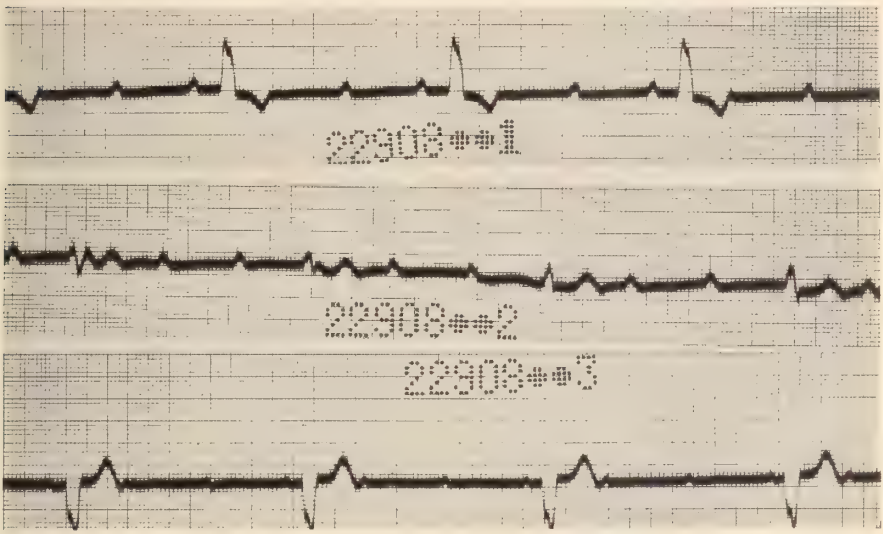


FIG. 1. Electrocardiogram of Case 1

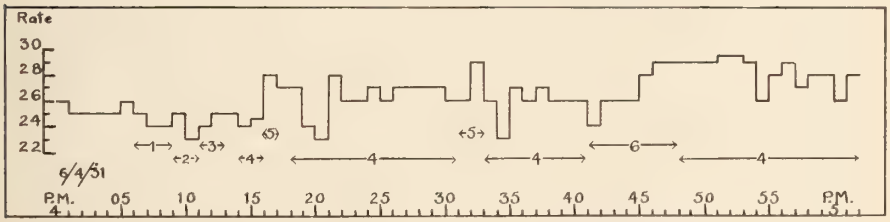


FIG. 2. Case 1. Continuous one hour record of ventricular rate obtained with the cardiotachometer. *1*, emotional test; *2*, walking slowly; *3*, walking fast; *4*, sitting; *5*, walking upstairs; *6*, eating supper.

ventricular rate during sleep are quite analogous to those observed in normal individuals (1).

Case 2 (H. N. 329177). A man, 34 years of age, had had no known rheumatic infection but had known of a leaking valve for ten years. He had had no symptoms until ten months before his admission to the hospital,

TABLE 1

Continuous record of heart rate during one night. Case 1

TIME	RATE	REMARKS	TIME	RATE	REMARKS
P.M.			*A.M.*		
5:41	23	Walking	1:38	22	Sleeping; right side
42	24	Walking	41	21.7	Sleeping; right side
43	24	Walking	44	23	Coughed
44	24	Walking	48	23.8	Lying awake
46	24	Walking	52	20.2	Lying awake
			2:00	22	Lying awake
5:50	24	Sitting	02	19	Lying awake
53	24	Sitting	08	22.7	Lying awake
			10	24	Lying awake
7:19	25	Walking	12	23	Lying awake
9:23	26	Sleeping	2:27	21	
25	26	Sleeping			
28	29	Sleeping	2:37	23	
48	27	Sleeping	38	22	Sleeping on back
51	25	Sleeping	42	20	Sleeping on back
54	26	Sleeping	43	18	Sleeping on back
59	26	Sleeping			
			3:01	22	Sleeping on back
10:03	25.2	Sleeping	05	22.7	Sleeping on back
09	24.3	Sleeping	10	22.8	Sleeping on back
13	24	Sleeping	20	22.6	
23	24	Sleeping	30	22	
43	24.4	Sleeping	40	22.1	
57	24.7	Sleeping			
			3:53	21	
11:00	24.3	Sleeping			
10	24.3	Sleeping	3:54	22	Sleeping
20	24.5	Sleeping	55	23	Sleeping
30	25.7	Sleeping (moved)	56	22	Sleeping
40	24.9	Sleeping	57	22	Sleeping
50	25.1	Sleeping	58	24	Sleeping
			59	23	Sleeping
A.M.			4:00	22	Sleeping
12:01	24.6	Sleeping	04	22	Sleeping
11	24.3	Sleeping	10	21	Sleeping
21	24.6	Sleeping			
31	24.7	Sleeping	4:24	22	Sleeping
41	24.9	Sleeping	25	18	Sleeping
54	25.6	Stirring and cough	26	20	Sleeping
55	22	Sleeping	5:00	22	Sleeping
56	23	Sleeping	05	23	Sleeping
58	24.5	Sitting; awake	07	23	Awake
1:03	24.4	Sitting; awake	10	24.6	Coughing
			15	22.6	Quiet
1:17	23		20	22.4	
20	23		25	21.8	
23	23	Sleeping; right side	30	22.6	
25	22	Sleeping; right side			
27	22	Sleeping; right side	5:45	22	Praying
32	21.6	Sleeping; right side	49	20	
36	23	Sleeping; right side	51	22	

when he began to experience substernal pressure, and dyspnea and orthopnea at night. The symptoms had been gradually progressive. The dyspnea became more and more severe, and edema of the legs developed. The symptoms and signs of heart failure readily yielded to active diuretic treatment.

Examination revealed huge enlargement of all of the chambers of the heart, particularly of the left ventricle. The first heart sound was of good quality. At the apex there was a loud systolic murmur transmitted to the axilla. At the aortic area there was a systolic thrill and systolic murmur, and to the left of the sternum there was a loud diastolic murmur. The heart rate was 36, with frequent extrasystoles. The blood pressure was 170 systolic and 80 diastolic. The electrocardiogram revealed complete heart block. The lungs were clear. The liver extended three finger-breadths below the costal margin.

His heart rate was also studied with the aid of the cardiotachometer. The waking rate ranged from 40 to 44, with about 8 extrasystoles to the minute. During sleep the rate dropped, at first to from 30 to 34 with about the same number of extrasystoles, indicating a drop in rate of about 8 beats per minute. Later during the night, the extrasystoles disappeared and the ventricular rate remained at between 25 and 26 beats per minute.

Case 3 (H. N. 317057). A man, aged 68, was admitted to the hospital on August 2, 1931, because of attacks of unconsciousness. For two weeks previously he had experienced constant vertigo and a sense of constriction in the chest, and repeated attacks of unconsciousness. He had many such seizures while in the hospital. During one the pulse was not felt for $4\frac{1}{2}$ minutes. On another occasion the ventricular rate fell to 12, and then quickened to 100. The attacks were arrested when he received 30 mg. of barium chloride three times a day. He received this dosage of the drug during most of his stay in the hospital.

The heart was only slightly enlarged. The first heart sound was of fair quality, the aortic second accentuated. There was a systolic murmur at the apex. The ventricular rate ranged between 28 and 33 beats a minute. The blood pressure was 200 systolic and 80 diastolic. The lungs were clear; the liver extended to the umbilicus. The Wassermann reaction of the blood was negative.

During the night of September 9th, 1931, he was studied electrocardiographically for four hours. The amplifier type of electrocardiograph was used. Continuous contact of the electrodes was maintained by a paste of starch in salt solution. Only lead 2 was employed. Figure 3 represents successive electrocardiograms, and table 2 gives the corresponding heart rates. The rate was calculated by measuring each interventricular interval and averaging them. From 15 to 25 intervals were recorded each time.

In this case the ventricular rate was very labile. Before he fell asleep it was 50. With sleep it dropped to 30, but after $2\frac{1}{2}$ hours rose to 41.7 and remained at about this level for the next 40 minutes, when the experiment

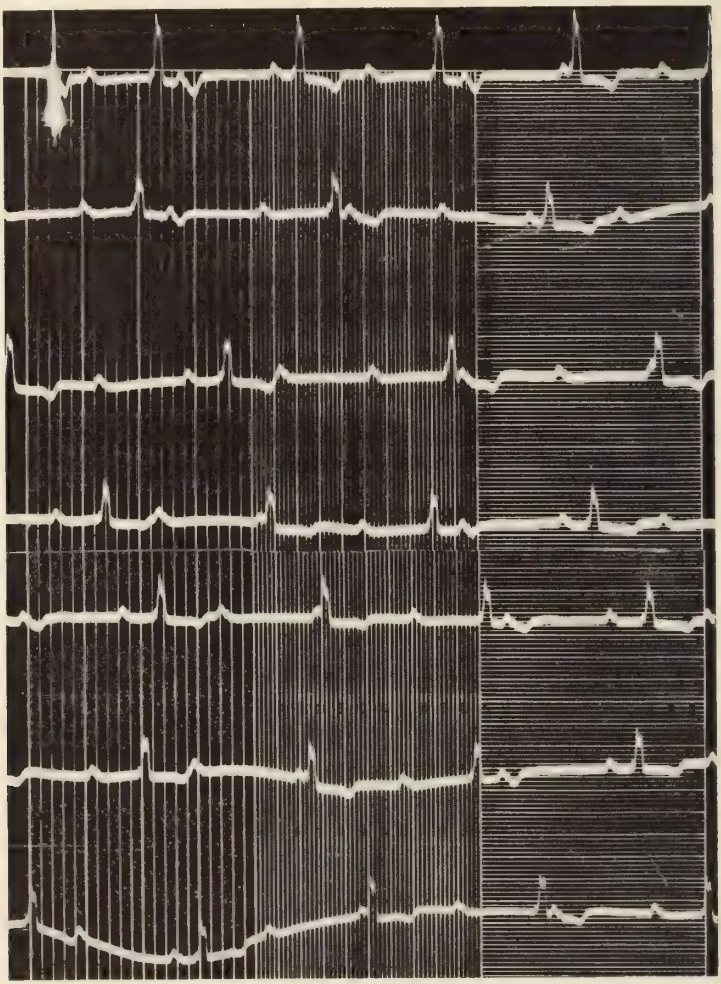


Fig. 3. Successive electrocardiograms, all in lead 2, of Case 3. Each strip represents one observation. The time of these observations reading from above downwards was 9:30 P.M., 10:30 P.M., 11:55 P.M., 12:55 P.M., 1:20 A.M., 1:35 A.M., 1:36 A.M.

was interrupted. The auricular rate did not vary in the same direction nor in proportion to the ventricular rate, but showed a very gradual slowing during the four hours from 68 to 63.8.

This case is not so striking as the first two, because it represents a form

of heart block with a rate that is very labile most of the time. Moreover, it is uncertain whether or not the barium chloride contributed to the variations in rate in this instance.

Such variation in ventricular rate in patients with heart block is not unusual. Indeed it will be found in most instances, if sought for. I have at present under my care another patient with complete heart block, with variations of ventricular rate of similar magnitude. Dr. S. P. Schwartz has shown me records of three patients whom he studied at Montefiore Hospital who exhibited similar phenomena.

TABLE 2

Successive electrocardiograms during sleep. Case 3

TIME	AURICULAR RATE	VENTRICULAR RATE	REMARKS
P.M.			
9:30	68	50	Talking
10:30	68	30	Asleep on back—voltage QRS lower
11:40	68	30	Asleep on back
11:55	68	31.2	Asleep; moved—rate varies from 28.3 to 33
A.M.			
12:20	75	33.3	Sleeping—rate varies from 30 to 53
12:55	62.5	41.7	Sleeping on right side—rate constant
12:56	68	41.7	Sleeping on right side—rate constant
1:20	62	40.5	Sleeping on back—rate constant
1:35	63.3	40.5	Sleeping; stirred slightly—rate constant
1:36	63.8	40	Sleeping—rate constant

SUMMARY

The cases here recorded, as well as the many reported in the literature, make it clear that variability of the ventricular rate is the rule in the presence of complete heart block. This is most striking when the block is in the region of the auriculoventricular node, and when the ventricular rate is relatively rapid, but it may occur in all forms of block, even when the ventricular rate is as low as 25. In these latter cases the absolute change in rate is not so great as when the ventricular rate is rapid. But the percentile variation is almost of the same magnitude. Electrocardiographic studies have shown that the change in rate is not attributable to a shift in the ventricular pace-maker. The ventricular rate in patients with heart block varies in the same direction and in response to the same influences as does the rate of normal sinus rhythm. This suggests that even in the presence of complete heart block the ventricles are governed to some degree by the extrinsic nerves of the heart.

LITERATURE

(1) Boas, E. P. and Goldschmidt, E. F.: The Heart Rate. Baltimore, Thomas, 1932, p. 138.

(2) Gilchrist, A. R.: The Action of Atropine in Complete Heart Block. Quart. J. Med., 2: 483, 1933.

The Action of Adrenalin in Complete Heart Block. Idem., 2: 499, 1933.
The Effects of Bodily Rest, Muscular Activity, and Induced Pyrexia on the Ventricular Rate in Complete Heart Block. Idem., 3: 381, 1934.

(3) Rihl, J.: Ueber Vaguswirkung a. d. automatisch schlagenden Kammern d. Säugethierherzens. Pflügers Arch. f. d. ges. Physiol., 114: 545, 1906.

(4) Volhard, F.: Ueber d. Beziehungen d. Adams-Stokesschen Symptomenkomplexes zum Herzblock. Deutsch. Arch. f. klin. Med., 97: 348, 1909.

(5) Josué, O. et Godlewski, H.: Un Cas de Dissociation auriculoventriculaire complète; influences des éxercises musculaires. Bull. et Mém. Soc. méd. d. Hôp. de Par., 35: 901, 1913.

(6) Zander, E.: Zur Frage v. d. Wirkung d. extrakardialen Nerven a. d. automatisch schlagenden Ventrikel. Nord. Med. Arch., 1915, Afd. 2, Heft 2, No. 6.

(7) Wilson, F. M. and Robinson, G. C.: Two Cases of Complete Heart Block Showing Unusual Features. Arch. Int. Med., 21: 166, 1918.

(8) Campbell, M. and Suzman, S. S.: Congenital Complete Heart Block. Am. Heart J., 9: 304, 1934.

(9) Hecht, A. F.: Der Mechanismus d. Herzaktion im Kindesalter. Ergebn. d. inn. Med. u. Kinderh., 11: 324, 1913.

(10) Hart, T. S.: Functional Heart Block. Am. J. Med. Sc., 149: 62, 1915.

(11) Bloch, E.: Herzblock u. Vorhofsflimmern d. Einfluss d. extrakardialen Nerven a. d. Ventrikelrhythmus. Klin. Wchnschr., 5: 1930, 1926.

(12) de Graff, A. C. and Weiss, S.: Observations on the Extrinsic Nervous Control of the Auricles and Ventricles in Complete A-V Block in Man. J. Clin. Invest., 2: 227, 1926.

(13) Simici, D.; Dumitru, I. et Popesco, M.: Considerations sur un Cas de Dissociation Auriculo-Ventriculaire Complète et Permanente Juvénile. Arch. d. mal. du Coeur, 24: 94, 1931.

(14) Lewis, T.: The Mechanism and Graphic Registration of the Heart Beat, Ed. 3, Chicago, Chicago Medical Book Co., 1925, p. 423.

EMBOLISM OF THE BRACHIAL ARTERY

ALBERT J. SCHEIN, M.D.

[*Surgical Service of Dr. Ralph Colp*]

CASE REPORT

History (H. N. 372966). A male, 51 years old, was admitted to the medical service of the hospital in August 1934, complaining of cough and expectoration for many years and of dyspnea for one or two years. The latter had occurred in paroxysms resembling cardiac asthma. A diagnosis of chronic bronchitis and emphysema, auricular fibrillation and myocardial insufficiency was made. Although relieved by symptomatic measures, the patient was digitalized before discharge. This was to be kept up in the Out-Patient Department.

Shortly after discharge the patient was seized by intense, paroxysmal pain in the right upper extremity; the pain subsequently became constant and remained so up to the time of admission. The pain began over the inner side of the arm and radiated down the anterior aspect of the forearm to the wrist. It was accompanied by pallor, coldness and anesthesia of the hand and forearm. Within two and a half hours the patient was admitted to the hospital, and an hour and a half later, operative intervention was under way.

Examination. The physical examination revealed an emphysematous male with moderate cough, dyspnea, cyanosis and slow auricular fibrillation. The patient was writhing with pain which was localized to the right upper extremity. The radial and ulnar pulsations were not palpable, but the axillary and the brachial, down to about the level of the insertion of the deltoid muscle in the humerus, were easily felt. Below this point, the brachial could not be felt with ease although the operator (Dr. Stenbuck) just before incision felt it lower down to a point at about the junction of the middle and lower third of the humerus. The forearm, up to the elbow, was mottled, dusky and pale, but the hand below the wrist was dead-white with no evidence of any circulation. All motion and sensation were absent in the hand with a fairly definite line of demarcation at the wrist. Over the forearm all modalities of sensation were reduced, fading into normal sensation above the elbow. Muscular function was also impaired. The entire hand and forearm were cold. A transient glycosuria gave evidence of a lowered sugar tolerance and of possible diabetic tendency.

The obvious local diagnosis was embolism of the right brachial artery in its lower third with acute ischemia and ischemic neuritis of the right

hand and forearm, all consequent to cardiac auricular thrombi and auricular fibrillation. The case was considered particularly suitable for surgical intervention as the patient was relatively young, in comparatively good condition, and presented no evidence of heart failure or other emboli. Also, the artery was easily accessible with little operative shock.

Accordingly, the lower half of the brachial artery and its accompanying veins were exposed by a longitudinal incision from the antecubital fossa to the mid-humeral region. The artery was clearly seen to pulsate down to an obstruction at about the junction of its lower and middle thirds, proximal to the point of occlusion. The vessel was ligated and divided, and the embolus was extruded spontaneously. Two and a half inches of the brachial artery were then excised and the vessel ligated below. The accompanying veins were also excised for the same distance, between ligatures.

One day postoperative, the color and circulation had obviously returned somewhat as there was blanching with slow return of color on pressure over the nail beds. Gangrene was not threatened at any time although the skin over the dorsum of the wrist became discolored and somewhat ecchymotic for a few days. Function has gradually returned, the forearm and hand being as warm as those on the left side by the second week. The symptoms of ischemic neuritis have persisted longest. One month postoperative, there was still evidence of hypalgesia and hypesthesia as well as of diminished position and vibration sense in the hand excepting in the distribution of the ulnar nerve which recovered first. The sensation in the forearm was normal. Motion of the extensors and flexors of the wrist and fingers as well as of the small muscles of the hand was still considerably impaired, due mainly to disuse rather than to actual paralysis. Vascular pain disappeared immediately after operation, being replaced by pain in the surgical wound and on motion of the contracted peripheral muscles.

DISCUSSION

Applied Physiology. This case may be regarded as one showing a fairly successful result of the surgical treatment employed. To consider its rationale as well as the possibilities offered by other forms of treatment, the pathologic physiology of arterial embolic obstruction must be considered. Restoration of function in such cases depends on: (1) relief of the obstruction (embolectomy) or (2) establishment of a new or collateral circulation early enough to forestall gangrene or irreparable functional impairment of tissue.

It is notorious that embolism tends to produce gangrene peripherally far more often than simple ligature or indeed most other types of vascular injury at the same location. This is accounted for by the following circumstances:

(1) An embolus nearly always lodges at the origin of a large branch of the main vessel, thus plugging a large source of collateral circulation.

(2) A thrombus forms and is propagated for a long distance upwards and downwards in the main vessel, occluding the origins of most of the vessels which might be used in collateral circulation.

(3) From the time the embolism occurs, there is intense vasospasm of the main vessels, and of all peripheral branches, as well as for a short distance proximally. This tends to limit collateral circulation as opposed to simple ligature of the main trunk and is a prime factor influencing occurrence of gangrene.

(4) After a varying period, four to twenty hours, intimal changes occur in the vessel at the site of embolism, and there ensues local thrombosis which conduces to rethrombosis if the obstruction is removed. This is irremediable and is the source of most of the failures of embolectomy.

Conservative Therapy. It is because of these facts enumerated above that simple conservative therapy (non-operative, as by massage, heat, elevation, etc.) is so frequently unsuccessful. This frequently results in gangrene which, in the type of patient suffering from emboli, is almost always fatal. Recently, a non-operative (i.e., conservative) form of therapy has been used. It may yet radically change the treatment of embolic occlusion of great vessels in the extremities. This is the use of the "Pavaex" apparatus by Reid, Herrmann and others. In this, "passive vascular exercise" is applied to the vessels of the extremity by including the entire limb in an apparatus in which the atmospheric pressure can be shifted from positive to negative at will. The alternation of these is said to allay vasospasm, to relieve ischemic pain and neuritis and to lead to maximal and early formation of good collateral circulation. If these results are confirmed, treatment of embolization of the extremities will be rendered quite simple.

Embolectomy. Embolectomy, since the pioneer work of Key, has become recognized as the ideal treatment of embolism of large vessels. By this procedure, circulation is restored immediately, and the functional return is immediate and complete. Theoretically, at least, the collateral circulation and measures aimed at improving it are unimportant. Actually, the exact results are difficult to determine.

The question may be asked, what constitutes a good result? Is it the absence of gangrene? This must be answered in the negative, as it is well known that in complete ischemia of an extremity severe and even permanently disabling injury may result with little or no actual necrosis of tissue. This frequently occurs in conservative as well as operative (embolectomy) treatment of the condition under discussion. It is then paramount to have good circulation and good function in an extremity to evaluate results of embolectomy. Even then, it is well known that good circulation and good function may be obtained with no surgical intervention or with any other type of treatment. There may not even be a transient impairment. Embolectomy must be judged, then, on *the return of peripheral pulsations*

below the site of obstruction, which alone means complete, immediate and permanent restoration of circulation. It may be argued that even if pulsations disappear soon after operation or after several days, the temporary maintenance of some circulation permits collateral circulation to develop. Here, however, embolectomy ceases to be an ideal surgical treatment and becomes a palliative one, probably inferior to other palliative surgical measures to be discussed below and possibly to non-surgical measures such as "Pavaex".

That the above-mentioned considerations and mechanism of action of embolectomy must be reckoned fundamental is borne out by the examination of statistics from the literature compiled by Danzis in his comprehensive review of arterial embolectomy. In embolism of the upper extremity the statistics are most striking and discussion will be limited to those of the brachial artery.

Of nineteen cases of brachial artery embolism, seventeen were operated upon, the other two spontaneously gaining partial circulatory restoration which in one case went on to complete good function. The other died too soon to judge. Eleven (58 per cent) of the cases had complete circulatory restoration; four (21 per cent) had partial restoration and the remaining two died too soon to judge. Not all of the completely restored cases could be followed. Ten such cases of mixed, upper extremity, embolic, arterial obstruction (brachial, axillary or subclavian) were observed six months or longer and found to have perfect circulatory restoration and function with *no peripheral pulsations patent.* Of four cases of brachial embolectomy operated upon between one and six hours, with perfect circulation restored, three had no peripheral pulses (radial) after six months. Two others, dead within one week of operation, had no evidence of vascular impairment with no patent peripheral pulses. Among 6,000 post mortem examinations, there are recorded fifteen cases of arterial emboli which had occurred weeks and months before death. Eight of these showed no gangrene and few symptoms and evidence that restoration of circulation had occurred spontaneously through collateral vessels. This indicates the paramount importance of the collateral circulation even in so-called successful cases of embolectomy.

The causes of failure to completely open the circulation in the main vessel are among those suggested by Neuhof and others:

(1) *Delay.* The time interval preceding operation is of fundamental importance. This is due to the intimal and thrombotic changes occurring around the embolus in four to twenty ± hours. Of 282 cases of embolectomy collected by Pearse, 119 had restored circulation (41 per cent). Of those operated upon up to eight hours after embolism 50 to 60 per cent of good results are reported; from eight to twenty-four hours, 20 to 25 per cent; over twenty-four hours, nearly all poor; and only in one case, at forty-eight hours, reported by Key, was success obtained. (These suc-

cesses are based mainly on absence of gangrene and not on restoration of pulsation.)

(2) *Faulty technique.* A meticulous, non-traumatizing technique, as given originally by Carrel, is necessary.

(3) Re-embolism and rethrombosis postoperatively.

(4) The general poor condition of the patient and the frequent arteriosclerotic changes of the vessel rendering arteriotomy difficult without rethrombosis.

(5) Difficulty in the diagnosis of embolism and especially in its exact site, which delays surgery. Symptoms may begin only some hours after the actual embolism due to spread of thrombosis producing complete ischemia.

Ligation of Veins. In order to overcome the above difficulties, it has been attempted to find other means of restoring circulation by collateral blood supply as early and as completely as possible. One of these is ligation of the veins accompanying the blocked artery at the site of occlusion. For years, it has been a general belief that if veins accompanying a main artery were ligated as soon after obstruction as possible, collateral circulation was stimulated and gangrene was less likely to ensue. However, until recently, there was no direct evidence of this. Makins (quoted by Brooks) reviewed all the wartime arterial injuries requiring major arterial occlusion by ligature and showed that in ligation of arteries alone, 40 per cent developed gangrene, but with ligation of veins as well, only 25 per cent developed gangrene. This was only a rough comparison. He also demonstrated increased vascular pressure in the distal parts after ligation of veins. Holman (cited by Pemberton) showed that blood pressure will be raised higher if the vein is ligated at a point equidistant to the arterial obstruction, thus restoring as Reid states, the balance of arterial influx and venous efflux in the extremity.

Recently, experimental evidence of the beneficial effect of ligation of veins in arterial obstruction has been offered by Brooks. In 100 rabbits with ligation of the iliac artery, 46 per cent developed gangrene. In 100 others, with simultaneous ligation of vein and artery, only 4 per cent developed gangrene, and this was less severe and with less extensive contracture and paralysis.

Surgical Means of Improving Collateral Circulation. Therefore, since embolectomy is a relatively uncertain procedure, although its results are theoretically very good, and since ligation of veins, while an adjuvant in preventing gangrene, is insufficient, other methods of treatment have been proposed. Periarterial sympathectomy has been employed since Leriche popularized its use to relieve vasospasm in arterial diseases of various kinds. While it has been shown that it produces incomplete vasodilatation peripherally, and that better results are obtained from cervical or lumbar sympathetic ganglionectomy, it is, nevertheless, certain that it

allays vasospasm and results in vasodilatation, rise in skin temperature, and increased blood flow. In fact, it is not improbable that in cases in which embolectomy produces a successful result, without, however, restoring the pulsations in vessels distally, the periarterial sympathectomy incidental to the exposure and the stripping of the vessel serves as a temporary aid to collateral blood flow and to the removal of the embolus and adjacent thrombi.

Leriche has expressed the thought that an obstruction of a main arterial trunk by an embolus or by some other sudden cause results in the change of the artery to an overactive sympathetic reflex system producing vasospasm. Since ganglionectomy is too formidable a procedure to use in such gravely ill patients, Leriche has developed a modification. He excises a wide area of the obstructed vessel including, if possible, the site of obstruction. This takes the place of a sympathectomy. The use of this procedure has been extended to all types of arterial obstruction. Leriche has used it now for over ten years in all situations where the ligature was previously used. He also uses it in late cases of embolism with threatened gangrene, local thromboses, and when embolectomy is impractical or the diagnosis as to time of onset or location is uncertain.

Surgeons in general are averse to giving up the benefits of a successful embolectomy, the results being often highly satisfactory. Leriche, too, does embolectomy if the case is seen within twenty hours of the embolism. However, postoperately, if the pulsations disappear once more as evidence of rethrombosis, with impending gangrene, he re-exposes the operative field and excises the artery for its vasodilating effect. If the circulation cannot be restored at once at the time of operation, he likewise excises a portion of the artery including the region of the embolus.

In this case, because of the too frequent failures of embolectomy in restoring pulsations, especially in a small vessel like the brachial, the excision of the artery and ligation of veins were done with a relatively good result and with the likelihood that complete circulation and function would be established in a short time.

REFERENCES

Brooks, B.; Johnson, G. S. and Kirtley, J. A., Jr.: Simultaneous Vein Ligation in Arterial Obstruction. Surg., Gynec. & Obst., 59: 496, 1934.

Danzis, M.: Arterial Embolectomy. Ann. Surg., 98: 249, 1933.

Leriche, R.: Periarterial Sympathectomy—Critical Study of the Value of the Operation. Nelson's Surgery, Vol. 3, p. 792.

Neuhof, H.: Embolectomy with Partial Arterial Occlusion for Embolism of Extremities. Ann. Surg., 96: 44, 1932.

Pearse, H. E.: Embolectomy for Arterial Embolism of Extremities. Ann. Surg., 98: 17, 1933.

Pemberton, J. de J.: Embolectomy; Report of 3 Cases. Ann. Surg., 87: 652, 1928.

Reid, M. R. and Andrus, W. de W.: Thrombectomy and Embolectomy. Nelson's Surgery, Vol. 1, p. 683.

BACTERIAL ENDOCARDITIS DUE TO A GRAM-NEGATIVE COCCO-BACILLUS OF UNDETERMINED IDENTITY

. CHARLES K. FRIEDBERG, M.D.,[1] LOUIS GROSS, M.D.,[1] AND SAMUEL C. BUKANTZ, M.D.

[*From the Medical Service of Dr. B. S. Oppenheimer and the Division of Laboratories*]

The following case of bacterial endocarditis is reported because the causative organism could not be identified with any thus far encountered in this disease.

CASE REPORT

History (H. N. 369660). An eighteen year old student entered the hospital August 8, 1934 complaining of fever of 2½ weeks' duration. Her previous history included scarlet fever, nosebleeds and pains in the calves. At the age of 8 she was told she had a cardiac murmur.

Her present illness began 3 months before admission with an attack of grippe. Since then she has felt tired and drowsy and there was slight, persistent fever. Two-and-a-half weeks before admission there was an exacerbation of symptoms. She developed daily headaches, unusual fatigue, generalized aches; and her temperature rose to 102°F. Three days before admission, she suffered a violent, shaking chill lasting ten minutes and this recurred twice in the next few days. Her temperature during the latter period rose to 105°F.

Physical Examination. The patient was pale, febrile and well nourished. There were several petechiae in the right conjunctiva, some with white centers. The heart appeared to be enlarged. The apical impulse was diffuse, forceful and maximal in the sixth interspace. There was a diastolic thrill over the precordium. At the apex there was a long, rough, systolic murmur. At the base and along the left border of the sternum there was a puffing, diastolic murmur. The second pulmonic sound was accentuated and was louder than the second aortic sound. The blood pressure was 140 systolic and 40 diastolic. The edge of the liver was just palpable and tender. The spleen was felt about 2 cm. below the costal margin. There were scattered, pink, macular lesions on the neck and upper extremities. They faded on pressure.

Clinical Diagnosis. Rheumatic cardio-valvular disease. Mitral stenosis and insufficiency. Aortic insufficiency. Subacute bacterial endocarditis.

[1] Aided by a grant from the Lucius N. Littauer Foundation.

Laboratory Data. Examination of the blood showed:

	August 9, 1934	*August 31, 1934*
Hemoglobin	86%	55%
Leucocytes, per cu.mm.	11,600	14,400
Polymorphonuclears		
Segmented	77%	67%
Non-segmented	6%	16%
Lymphocytes	9%	8%
Monocytes	8%	5%
Macrophages	—	1%
Myeloblasts	—	2%
Plasma cells	—	1%

The sedimentation time of the red blood cells was 13 minutes. The blood Wassermann reaction was negative. The blood urea nitrogen was 13 mg./100 c.c. On August 31st, this was 148 mg./100 c.c. Electrocardiograms revealed sinus tachycardia with a rate of 130-140 per minute. The P waves were notched and wide in lead II. The QRS waves were slurred and notched in lead IV. The Q wave was large in lead III. The RST transition was elevated in lead III. The P wave abnormalities were interpreted as indicating hypertrophy of the auricles, and the QRS abnormalities as indicating myocardial damage. The urine was acid to litmus, of low specific gravity (1012–1016), was free from albumen at first, but later contained 2 plus albumen. There were occasional leucocytes and erythrocytes in the sediment.

Bacteriology. Four blood cultures were made during life, on August 8th, 11th, 15th and 20th respectively. On each occasion a Gram-negative cocco-bacillus was obtained in all fluid and solid media, aerobically and anaerobically. There were between 75-150 colonies per cubic centimeter of blood. The organism was decolorized by Gram's stain, arranged in aggregates or diplo form and occasionally manifested definite bacillary forms. Growth occurred within 24 hours on all routine media and subcultures except Endo, at temperatures between 22°–37°C., optimally at 37°C. During the early subcultures the colonies were very friable, uniformly of the "rough" type, with wrinkled surface and scalloped edge and could be removed intact from the surface of the solid media. Growth in plain nutrient broth after 24 hours was granular and without turbidity. There was spontaneous agglutination in normal and .5 per cent saline. The organism exhibited no motility. It decolorized litmus milk. It fermented none of the carbohydrates. Precipitation and agglutination reactions with antisera for the meningococcus, gonococcus, Brucella melitensis and abortus respectively were all negative. Agglutination absorption reactions performed with serum prepared by injecting cultures of the organism into rabbits indicated a close relationship to an organism described by Goldstein (1) as micrococcus Neisseria pharyngis. Our organism, how-

ever, differed from the latter in several respects, including the occurrence of bacillary forms and the failure to ferment carbohydrates, as well as in certain cultural features. Consideration of the various features led us to believe that we were dealing with some atypical form of the Neisseria pharyngis group or some unusual member of the Alkaligenes group. The same organism as the one cultured from the blood stream was obtained post mortem from portions of the vegetations on the mitral valve. A smear from the throat revealed similar Gram-negative cocco-bacilli.

Course. The patient's stay in the hospital was characterized by a septic, febrile course with rises of temperature from 100° to 104° or 105°F. There



FIG. 1. Bacterial endocarditis of the mitral valve (*A*). Smears and culture showed a Gram-negative cocco-bacillus. Note also bacterial lesions of the left auricle (*B*) superimposed on old rheumatic lesion (*C*).

were recurrent crops of white-centered petechiae in both conjunctivae and in the anterior faucial pillars. Splinter hemorrhages occurred under the nail of the right middle finger. There were bluish tender nodes on the pad of the left index finger. The fingers became clubbed. The spleen grew larger and tender. Despite transfusions the anemia became more marked, and the patient exhausted. She developed pneumonic signs over the whole left lung and the base of the right lung. Three days before death there was evidence of uremia. Death occurred $3\frac{1}{2}$ weeks after admission and at least 6 weeks after onset of definite febrile symptoms.

Necropsy Findings. Heart. The heart was universally enlarged and

weighed 400 grams. The left auricle was definitely dilated. Its posterior wall was raised into irregular plateaus which were, for the most part, smooth and resembled the lesion commonly found in rheumatic fever. The lower portion of this lesion was covered by yellowish, granular, flat vegetative processes continuous with the vegetations to be described as occurring on the mitral valve (fig. 1). Covering the posterior aspect of the anterior mitral leaflet, as well as most of the posterior leaflet, there was a florid bacterial vegetation extending up the left auricular wall. This lesion was somewhat flattened on the posterior leaflet but more pyramidal and polypoid on the anterior leaflet where it approximated the size of a hazelnut. Crushings from the vegetations showed Gram-negative coccobacilli. One of the chordae tendineae to the anterior leaflet was ruptured. All of the chordae were thickened. The aortic valve cusps showed typical rheumatic thickening, and inversion and elevation of the semilunar folds. There was mild fusion of the commissures and beginning endocardial reduplication 5 mm. below the right cusp. Both ventricles and the right auricle were dilated. On the posterior surface of the heart, along the descending branch of the right coronary artery at about its middle, there was a small, firm, knob-like protrusion of reddish-brown color and $\frac{1}{2}$ cm. in diameter. On section, the coronary artery at this point was completely occluded by a firm, grayish-brown plug which was adherent to the wall of the vessel.

Microscopically, there was an irregular reduplication of the left auricular endocardium, consisting of smooth muscle and connective tissue. The endocardium was capillarized and showed foci of necrosis with lymphocytic infiltration. The inner surface was covered by thrombotic material. The mitral valve was considerably thickened and hypercapillarized, and the auricular layers showed marked necrosis and infiltration with polymorphonuclear leucocytes. The surface of the auricular layer throughout most of its extent was covered with flat bacterial masses. There was a florid lesion of the ring of the valve with vessels of the intimal musculo-elastic hyperplastic type. The whole picture was that of a bacterial endocarditis superimposed on a previous rheumatic infection (fig. 2). The aortic, pulmonic and tricuspid valves showed thickening, vascularization and low grade infiltration with lymphocytes and plasma cells. The pulmonary conus showed definite bacterial masses within small vessels. The myocardium of the septum showed small abscesses. There was considerable scarring of the myocardium and diffuse infiltration with leucocytes and lymphocytes. There were no Aschoff bodies.

Lungs. The lungs were edematous and exuded reddish-brown frothy fluid. The right and left lower lobes were congested, firm, slightly granular and did not crepitate. Microscopically, these areas showed atelectasis, edema and some disturbance of the alveolar architecture. The septae

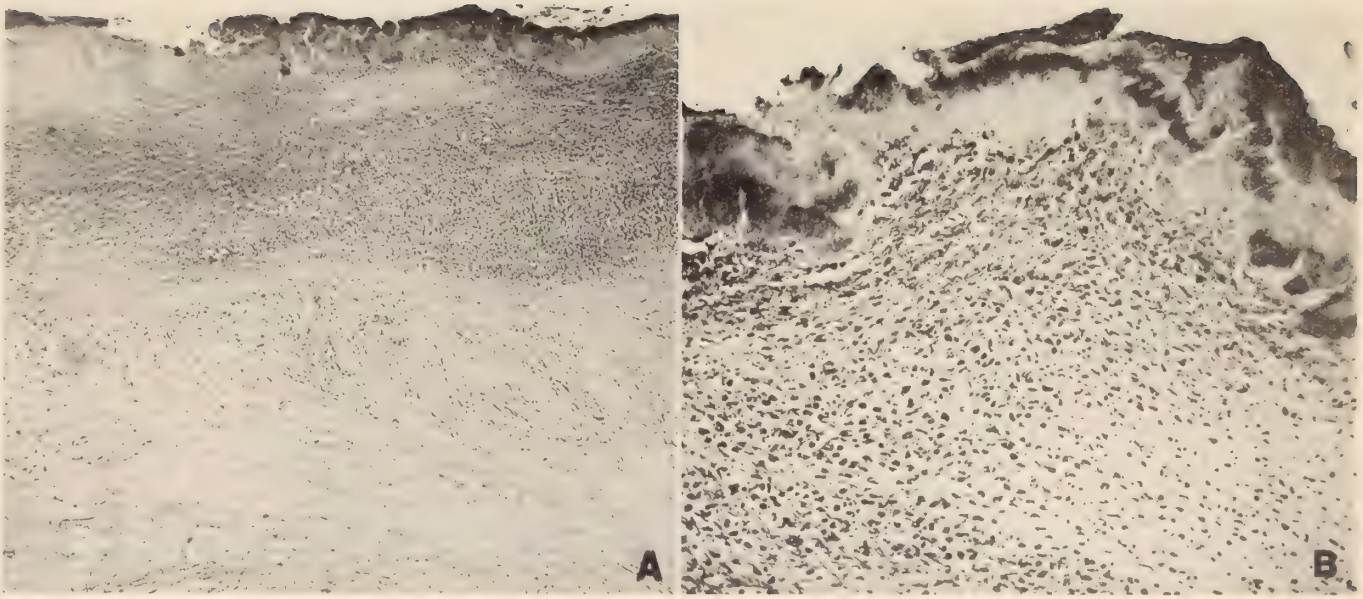


FIG. 2. Bacterial endocarditis of the mitral valve. *A*. Low power view of section showing bacterial vegetations, necrosis and marked purulent infiltration of the superficial portion of the valve. Note also the extensive capillarization. *B*. Medium power view of the vegetation and subjacent area.

were thickened and the alveoli were filled with red blood cells, macrophages, lymphocytes and occasional polymorphonuclear leucocytes.

Kidneys. The kidneys were slightly enlarged. Their capsules stripped easily. There were occasional pinpoint hemorrhages. There was one small, irregular whitish area on the surface of the right kidney measuring 3–4 mm. in diameter and extending into the kidney substance for about 2 mm. Microscopic examination revealed marked proliferation of the glomerular capillary endothelium. There was marked avascularity of the capillary loops. There was granular degeneration of the tubular epithelium.

Liver. The liver was slightly enlarged and showed numerous, irregular, yellow deposits. There was cloudy and granular degeneration. The *spleen* was markedly enlarged, weighing 660 grams. There were numerous, circumscribed, yellowish areas measuring 0.5 to 3 cm. in diameter. The follicles and trabeculation were moderately obliterated, and the pulp scraping showed a moderate amount of sanguineous fluid.

Anatomic Diagnosis. Bacterial endocarditis superimposed on chronic rheumatic valvular disease. Mitral stenosis and insufficiency. Aortic stenosis and insufficiency. Left auriculitis. Mycotic aneurysm of the right coronary artery. Acute diffuse glomerulonephritis. Bronchopneumonia. Pulmonary edema. Subacute infectious splenic swelling with multiple infarcts.

COMMENT

Cases of bacterial endocarditis associated with Gram negative cocci are usually due to the gonococcus, more rarely to the meningococcus. Agglutination reactions with antisera for these organisms were negative in our case. Because of the occurrence of bacillary forms, the influenza bacillus and Brucellae abortus and mellitensis were considered as possible causative agents. These were readily excluded on cultural and immunological grounds. Our organism corresponded in some respects with the non-motile, non-pathogenic forms of the alkaligenes group. Absolute identification was not possible. Thus far, no cases of bacterial endocarditis have been ascribed to the non-motile members of the alkaligenes group.

Three cases of bacterial endocarditis have been attributed to a Gram negative coccus described as the micrococcus pharyngis siccus by Schultz (2); by Graef, de la Chapelle, and Vance (3); and by Goldstein (1). Studies with the organism, kindly provided by Dr. Goldstein, showed certain close serologic resemblances to our organism. There were, however, definite morphologic, cultural and biologic differences. The three cases, above mentioned, ran a much more acute course than ours, the durations being 18, 6 and 14 days respectively. Coulter (4) reported a case of bacterial endocarditis due to a Gram-negative micrococcus which resembled the micrococcus pharyngis siccus, but differed in its extremely delicate growth

and in the occurrence of curious bacillary forms. The duration of the illness was three months. Another case of bacterial endocarditis due to a Gram-negative cocco-bacillus was reported by Pallazzo (5). Both of these organisms appeared to possess certain cultural and biologic reactions which differed from those of our organism.

Certain of the clinical and pathologic features of our case are worthy of note. Bacterial endocarditis has been divided into acute and subacute forms on the basis of the duration of the illness, six weeks being an approximate dividing line. This division is not entirely arbitrary as the causative organisms are generally different for the two forms. As regards its duration our case was a borderline one, lasting between six weeks and three months according to the interpretation of the onset of the illness. The occurrence of myocardial abscesses was more typical of the acute forms due to pyogenic organisms. The rapid development of uremia associated with a diffuse glomerulonephritis was an unusual feature. None of the five cases mentioned above showed this. In other respects the clinical history and pathologic findings were the usual ones in cases of bacterial endocarditis. The occurrence of the vegetations on a valve previously attacked by rheumatic fever is well known. The portal of entry is undetermined although the onset with grippe and the predominance of Gram-negative cocco-bacilli in the throat seemed to point to the upper respiratory tract. In any event, this fatal infection was apparently caused by an organism which is ordinarily non-pathogenic.

REFERENCES

(1) Goldstein, J. D.: Endocarditis due to Neisseria Pharyngis Organism. Am. J. M. Sc., 187: 672, 1934.

(2) Schultz, O. T.: Acute Vegetative Endocarditis with Multiple Secondary Foci of Involvement. J. A. M. A., 71: 1739, 1918.

(3) Graef, I., de la Chapelle, C. E., and Vance, M. C.: Micrococcus Pharyngis Siccus Endocarditis. Am. J. Path., 8: 347, 1932.

(4) Coulter, C. B.: Gram-negative Micrococcus Causing Fatal Endocarditis. Proc. N. York Path. Soc., 15: 7, 1915.

(5) Palazzo, R.: Sobre un nuevo caso de endocarditis primitiva producida por un coco-bacilo. Rev. sud-am. de endocrinol., 6: 105, 1923.

BENIGN SPINAL CORD TUMOR IN SUSPECTED MALIGNANCY

IRA COHEN, M.D.

[*Services of Dr. Israel Strauss and Dr. Ira Cohen*]

With increased knowledge of any given disease, surprises at the operating table or in the post mortem room occur less frequently. The ability to prognosticate preoperatively the expected pathology is acquired from a knowledge of the life history of a lesion culled from the combined experience of all the workers in that field, and by a careful study of the individual patient. In dealing with tumors of the central nervous system this study aims, in addition to making the diagnosis of a tumor and its location, at ruling out the possibility of the growth being secondary. There are occasions when it is perfectly justifiable to deliberately attack a known metastatic tumor. But it is well to realize beforehand that the neoplasm is secondary. Aside from the fact that in most instances no benefit accrues, it is well known that such patients withstand poorly major surgical procedures.

A detailed history often yields the necessary clue for intensive investigation of certain organs. Occasionally, in spite of all examinations, a primary malignancy may be missed. More rarely does it happen, as illustrated by the two cases reported here, that very suggestive signs of a primary malignancy elsewhere are found in the presence of a primary benign spinal cord tumor.

CASE REPORTS

Case 1 (H. N. 362337). Roentgenographic evidence of a gastric lesion one year. Pain in back and legs with weakness of legs three months, sphincteric disturbance two months. Signs of spinal cord compression and partial block with indefinite localizing signs. Removal of a benign intradural extramedullary tumor.

On February 5th, 1934 a 68 year old man was admitted to the Neurological Service complaining of pains in the back and legs, weakness of the legs and vesical disturbances. About a year before his admission he had applied for treatment in the Out-Patient Department complaining of generalized weakness and constipation. There gastrointestinal X-ray studies showed a prepyloric defect of the stomach, the cause of which was suspected of being malignant. This defect was confirmed on repeated investigations. The patient, however, had no complaints referable to his stomach. He did complain bitterly of pains down the back of both legs which he stated had been present for three months and which seemed to spread downward from the lumbar region. Two months previously he

suddenly lost control of both his bladder and rectum. There had been a moderate loss of weight and mild complaints of dyspnoea, dizziness and cough.

The patient appeared ill but was not cachectic. His general physical examination disclosed only a moderately enlarged prostate and a rectal sphincter lacking in tone. The neurological examination brought out weakness in both lower extremities more pronounced on the left side. The deep reflexes were hyperactive in both upper and lower extremities and



FIG. 1. Case 1. Iodized oil arrested at the second thoracic vertebra

there was an ankle clonus on the left. The abdominal reflexes were absent. The sensory examination was most unsatisfactory because it was felt that the patient was not dependable. Vibratory sense was absent anteriorly up to and including the iliac crests and posteriorly over the spine to the mid thoracic region. There was a questionable narrow zone of hyperaesthesia about the third thoracic segment. Definite statements for other modalities of sensation could not be made.

On February 6th a lumbar puncture yielded xanthochromic fluid and showed a partial block. The total protein of the fluid was 136 mg. Roent-

gen examination of the spine was reported as showing a moderate spondylitis. Because of the previous gastric findings reëxamination of the stomach by a barium meal was carried out, and again a defect in the prepyloric region was found. The gastric analysis showed blood and no free acid in the fasting content, with 30 free and total acid of 52 after the administration of histamine.

The lumbar puncture was repeated on the 12th and 18th of February. Each time the fluid was clear without block and contained protein of 70–80 mg. Meanwhile the patient's complaints of pain were less. The physical examination showed no change except that the abdominal reflexes were obtained. No sensory level could be established.

While the diagnosis of a metastatic spinal cord tumor secondary to a gastric neoplasm was entertained, it was not proven. A review of the various stomach X-rays was made, and absence of any progression of the lesion in the year's observation was noted.

Therefore, when on March 12th a fourth lumbar puncture yielded xanthochromic fluid with partial block and a total protein content of 215 mg., and when a suggestion of a level at about thoracic 3 segment was confirmed by a lipiodol block at the second thoracic vertebra, the patient was transferred to the Neurosurgical Service for operation.

Because of the slight cough the laminectomy was done under local anesthesia. The cord was found pushed backward by an anteriorly placed tumor opposite the second and third thoracic vertebrae. The growth lay inside the arachnoid. It was completely removed and reported a hemangioendothelioma.

The operation was followed by prompt improvement in the power of the legs, and by return of sphincteric control. However, the vibratory sense remained impaired. A manometric study two days before the patient was discharged showed no block.

COMMENT

Aside from the problem of deciding whether the cord tumor was primary or secondary, there existed the uncertainty of the exact location of the growth. Repeated sensory examinations were made but only after weeks of study was there even a lead. Iodized oil was indicated and determined the level. Of more than passing interest are the variations in the spinal fluid. On February 6 and March 12 the fluid was xanthochromic and had a high protein content; also partial block was found, while on February 12 and 18 the fluid was colorless and there was no block. Although no satisfactory explanation is offered for these variations, it is important to realize that they can occur.

Case 2 (H. N. 365123). Weakness of the legs for two years and pain radiating down both legs for one year. Complete paraplegia with a sensory level at the 11th thoracic segment. Absent hydrochloric acid and

presence of blood in the gastric analysis. Benign spinal cord tumor removed.

A 67 year old woman was transferred to the Neurological Service at The Mount Sinai Hospital from another institution. Her daughter, who gave the history of the illness, recalled vaguely that twenty-two years previously the patient had been confined to bed because of severe pain in the legs and inability to move. More details of that episode could not be obtained,



FIG. 2. Case 2. Iodized oil opposite the twelfth thoracic vertebra. (This is below the level of the tumor.)

but it was of interest because of the present illness. This began two years prior to admission with weakness in both legs and occasional cramp-like pain. She found difficulty in arising from a chair and in controlling her legs. About a year after the onset the cramps changed to sharp shooting pains in the legs and the unsteadiness grew so marked that in walking about the house she would hold on to objects for support. Involuntary spasms were noted. Four months prior to admission the patient observed that she could not tell the position of her legs in space. About this time she suffered severe burns from a hot water bag, which she did not realize was

hot. For three weeks she had been confined to bed. During her stay in the other hospital iodized oil had been injected about the level of the twelfth thoracic vertebra.

Examination showed clearly the results of a compressing lesion at the eleventh thoracic segment. There was complete paraplegia with a tendency to flexion contractions. Bilateral Babinski reflexes were obtained. The deep reflexes, however, were depressed. Below the level there was complete analgesia and anesthesia. A lumbar puncture yielded xanthochromic fluid with a protein content of 180 mg., and manometric studies showed a complete block. Roentgen examination of the spine showed a fusion of the 8th and 9th thoracic vertebrae, rather difficult of interpretation, and lipiodol in scattered droplets with the main mass opposite the 12th thoracic vertebra.

Gastric analysis showed complete achlorhydria even after the use of histamine, and blood was constantly present. This promptly raised the question of a metastatic spine lesion, especially since the fused vertebrae at the exact level were not easy of interpretation. But even before the gastric X-ray studies, the length of the history of spinal cord symptoms seemed too long for a metastatic tumor. The roentgen studies showed a paraoesophageal hernia of the stomach through the diaphragm. The patient was then transferred for operation.

At the laminectomy an anteriorly placed tumor was removed from opposite the 9th thoracic vertebra. The iodized oil seemed encysted by arachnoid adhesions opposite the 12th vertebra. The tumor was reported a meningioma.

The only improvement noted was a lessened spasticity of the legs and slight motion of the toes. A decubitus ulcer appeared. Four weeks after operation chills and a septic fever began, and she died five weeks after the laminectomy. The post-mortem findings included multiple emboli in the pulmonary artery and an acute hemorrhagic cystitis.

COMMENT

As helpful and necessary as iodized oil was in the first case so unnecessary was it in the second where a distinct level could be made on clinical signs. Moreover, its injection at a level below the level of the tumor served to complicate the picture. The damage to the cord before operation was such that no restitution was possible even by the removal of the tumor.

Exploratory operation is often the only method by which the character and operability of a suspected lesion can be determined. It is a justifiable procedure when all other means have been exhausted. In the surgery of the spinal cord it has entailed, at times, laminectomy without disclosing a remediable lesion. As was mentioned above, unsuspected secondary tumors have been disclosed.

In these two cases it was only after searching studies on the Neurological Service that the balance pointed to probable primary tumors warranting exploration.

CAVERNOUS SINUS THROMBOSIS FOLLOWING INTRANASAL INFECTIONS

JOSEPH L. GOLDMAN, M.D.

[*Service of Dr. Rudolph Kramer*]

During the past 15 years 12 cases of cavernous sinus thrombosis were observed at The Mount Sinai Hospital. Of these, six were secondary to intranasal infections, four to infections of the face and scalp, and two to pharyngeal infections. All of the patients presented a typical clinical picture of the disease. They all died and necropsies were performed in nine instances.

The high incidence of cavernous sinus thrombosis secondary to intranasal infection as found in this series is at variance with the figures obtained from the literature. Of the numerous reports on cavernous sinus thrombosis in the last two decades, there are only three cases (1) in which an intranasal infection is mentioned as the primary cause. In most instances the thrombophlebitis was traced to an otitic or facial infection. The 140 cases reported by Dorland Smith (2) in 1918 still represent a fairly accurate cross-section of the recorded etiologic sources of cavernous sinus thrombosis. His analysis showed that the original site of infection causing the thrombophlebitis was in 40 per cent the ear, in 35 per cent the face and orbit, in 13 per cent the mouth and pharynx, and in 9 per cent an intranasal structure. The last figure is obviously much lower than the 50 per cent of this series.

The spread of the infection in cases of cavernous sinus thrombosis secondary to intranasal disease is very likely by way of the small veins which drain the mucous membrane of the ethmoid labyrinths and sphenoid sinuses, pass through the bony walls, and empty into the cavernous venous sinuses.

This study is based on an analysis of the six cases in which the thrombophlebitis resulted from an intranasal infection. The cases are listed in the accompanying table.

DISCUSSION

The onset of the thrombophlebitis occurred at any time in the course of the original nasal infection and bore no relationship to the duration of the intranasal process. Once the manifestations of the thrombophlebitis became evident, the disease followed a rapidly progressive course. The symptoms and signs presented by these patients conformed quite consistently to the classical picture of cavernous sinus thrombosis. The ocular

	HISTORY	PHYSICAL EXAMINATION
R. O.; Male; 52 yrs.; 239829; 3/2/24; S. of Dr. Libman.	Upper respiratory infection—2 weeks. Fever, dyspnea, restlessness—3 days. Unconsciousness—1 day.	Eyes—early bilateral papilledema and vertical nystagmus. Acutely congested throat. Rigid neck. Bilateral Kernig and Brudzinski.
H. G.; Male; 10 yrs.; 281914; 7/22/27; Dr. Bass.	Severe frontal and occipital headaches. Drowsiness. Vomiting. Stiff neck. Double vision. Duration—5 days. (No history of injury—no operation.)	Right eye—chemosis, proptosis, and paralysis of external rectus muscle. Rigid neck. Bilateral Kernig. Paralysis R. 12th nerve.
G. W.; Female; 25 yrs.; 290762; 5/11/28; S. of Dr. Yankauer.	Pain, swelling—left side of nose—2 days. Edema left eye—1 day. Profuse purulent discharge—left side of nose. Fever, 101°–103°F. Patient had furuncle inside of left nostril shortly before admission. Headache developed in hospital.	Septic fever, 99°–106°F. Left eye—edema of lids, chemosis, proptosis. Right eye—proptosis and 6th nerve palsy.
B. M.; Male; 8 yrs.; 314659; 4/24/30; S. of Dr. Schick.	Previous sinusitis. Fever and adenitis—1 week. Redness, swelling of tissues about right eye, and proptosis of eye—2 days. Convulsions and high fever—last day.	Fever, 103°–105°F. Comatose. Right eye—chemosis, proptosis and bluish discoloration of soft parts. Right fundus—engorgement of veins and blurring of disc margins.
S. S.; Female; 2 mos.; 325836; 5/11/31; S. of Dr. Schick.	Purulent nasal discharge—6 weeks. Swelling right upper and lower lids, and cheek—1 week. Treated for pansinusitis at home without improvement.	Septic fever, 102°–105°F. Right eye—chemosis lower lid, swelling and edema of both lids, eyeball displaced upward and inward. Bronchopneumonia—right base—2nd day of admission. (3 days in hospital.)
C. S.; Female; 3 yrs.; 344588; 10/14/32; S. of Dr. Yankauer.	Nasal discharge—10 days. Fever up to 105°F. Slight swelling of tissues about right eye—8 days. Swelling of tissues about and protrusion of left eye—3 days. Drowsiness.	Comatose. Fever, 106°F. Bilateral orbital cellulitis with marked chemosis and edema—worse on left side. Eyes slightly proptosed. Erysipeloid rash on forehead. Bilateral Babinski and Brudzinski. Peripheral abscesses.

NASAL FINDINGS	LABORATORY FINDINGS	POST MORTEM
Acutely congested membrane and turbinates.	C. S. Fluid— W.B.C. 4000. Polym. 100. Pneumococcus Type I.	Acute ethmoidal and sphenoidal sinusitis with osteomyelitis of bone (Pneumococcus Type I). Purulent phlebitis of right cavernous sinus. Acute purulent meningitis.
Septal abscess with complete destruction of cartilage. Incision yielded 3 drams pus.	Blood culture— Staph. aureus. C. S. Fluid— W.B.C. 120–320. Polym. 70–81. Lymph. 5–6. Endoth. 25–13. Sterile.	Abscess of nasal septum. Purulent thrombosis of cavernous sinus.
Left side of nose completely occluded by swollen and congested turbinates and membrane. Operations: Sphenoethmoidectomy-granulation tissue in ethmoid cells and antrum. Ext. Exthmoid—no pus found. Exploratory left orbit—no pus found.	Blood culture— Staph. aureus.	Acute diffuse purulent meningitis. Purulent thrombosis of cavernous sinus.
Tenderness and induration inner angle right eye. Purulent discharge both sides. Operation: Ext. Ethmoid—pus in ethmoid cells.	Blood culture—streptococcus hemolyticus. C. S. Fluid— W.B.C. 2400. Polym. 100. Streptococcus hemolyticus	Acute ethmoiditis. Purulent thrombosis of cavernous sinus. Streptococcus hemolyticus meningitis.
Tenderness over right antrum and ethmoid. Brawny edema right infraorbital region. Thickness over right zygomatic and maxillary regions. Bluish red indurated nodule under skin of cheek. X-ray—marked density sinuses over right side. Operation: Buccal incision exposing anterior wall of antrum —no pus, roughened bone.	(Blood culture not taken to save veins.)	Acute sinusitis—right antrum and ethmoid. Generalized sepsis. Osteomyelitis of right antrum. Multiple abscesses of both lungs Purulent thrombosis of cavernous sinus.
Profuse purulent nasal discharge —both sides. Swelling of membrane and turbinates.	Blood culture— Staph. aureus. C. S. Fluid— W.B.C. 7200 Polym. 92 Lymph. 8 Staph. aureus. Peripheral Abscesses— Staph. aureus.	Acute purulent ethmoiditis with rupture into left orbit. Metastatic abscesses of lungs. Purulent thrombosis of cavernous sinus. Acute purulent meningitis.

findings, the manifestations of sepsis, the signs of meningitis, in addition to the local intranasal infection, comprised the salient features of the disease.

The most characteristic clinical manifestations were the ocular signs, some of which were present in every case. Chemosis, proptosis, and orbital edema were most constantly present, while paralysis of the external rectus muscle occurred in two cases, and papilledema was observed in one case.

The blood cultures of five patients yielded a bacterial growth. The staphylococcus aureus was obtained in three of the cultures, and the pneumococcus type I and streptococcus hemolyticus were each isolated once. In the sixth case whose blood was not cultured during life, the post-mortem examination revealed a generalized sepsis. Four of these patients developed acute meningitis.

In considering cavernous sinus thrombosis as a complication of an intranasal infection, it is necessary to exclude a similar condition which may result from a perforation of an infected ethmoidal cell or maxillary sinus. In the differential diagnosis, the position of the eyeball is most important. In cavernous sinus thrombosis, the proptosis is directly forward, while in a perforated ethmoidal cell the eyeball is also displaced downward and laterally, and in a perforated maxillary sinus the eyeball is displaced upward and laterally. In the two latter conditions paralysis of the abducent nerve and papilledema are not encountered. Bacteremia is very rarely seen in an acute sinusitis without an associated cavernous thrombophlebitis, osteomyelitis, meningitis, or cerebral involvement.

In four of the cases an acute sinusitis can be definitely regarded as the original focus of infection. The ethmoid sinuses were implicated in two patients, the maxillary antrum and ethmoid sinus in the third, while the ethmoid and sphenoid sinuses in the fourth patient. In the latter case there was an associated osteomyelitis of the sphenoid bone. A septal abscess and an intranasal infection of the soft tissues were the cause of the disease in the remaining two cases. It is significant that three of the patients with an acute sinusitis were children.

Though not every furuncle of the upper lip progresses to a cavernous sinus thrombosis, it is nevertheless universally regarded as a dangerous infection requiring the most diligent attention. It is noteworthy that no case of cavernous sinus thrombosis seen at The Mount Sinai Hospital during the past 15 years had its origin in a furuncle of the upper lip. However, as shown above, thrombophlebitis of the cavernous sinus did follow an acute sinusitis in four instances. In view of this consideration it is obvious that an acute virulent sinus infection, particularly in children, is a potential source of a very serious complication and, therefore, deserves the utmost care. Early and adequate therapy may well be regarded as a prophylactic measure.

The conservative therapy for acute sinusitis used at this hospital consists of dilute cocaine-adrenalin spray, steam inhalation, and oil spray, administered in succession and repeated frequently. In adults the steam inhalation is often followed by a hot nasal douche. A perforated infected sinus, an acute empyema of a sinus draining inadequately, a persistent bacteremia complicating an acute sinusitis, and signs of meningeal irritation are the conditions which require immediate surgical intervention.

REFERENCES

(1) Fabricant N. D.: Cavernous Sinus Thrombosis following Submucous Resection. Arch. Otolaryngol., 17: 635, 1933.

Manicatide, M., Fotiade, and Antonesco, P.: Gangrenous Thrombophlebitis of Cavernous Sinus following Fronto-Ethmoid Sinusitis. Bull. Soc. de pédiat. de Par., 28: 205, 1930.

Powell, L. S.: Septic Thrombosis of the Cavernous Sinus; Report of Two Cases. Tr. Am. Laryng. Rhin. & Otol. Soc., 34: 501, 1928.

(2) Smith, D.: Cavernous Sinus Thrombosis; with Notes of Five Cases. Arch. Ophth., 47: 482, 1918.

HODGKIN'S DISEASE WITH BILATERAL OBSTRUCTIVE PYELONEPHRITIS DUE TO INFILTRATION OF URETERS

DAVID BECK, M.D.

[*Service of Dr. B. S. Oppenheimer*]

History (H. N. 347334). The patient, a man aged 25 years, developed generalized pruritus three and one half years prior to admission to the hospital. It was followed several weeks later by a vesicular eruption over the entire body, described by him as "hives," which disappeared in six weeks. Six months later, he noticed a large node in the left cervical region, followed by a rapid development of nodes in both cervical, supraclavicular and axillary regions. The generalized pruritus returned, was more severe than before and was accompanied by a diffuse skin eruption. This consisted of small, shiny, white papules and larger red papules. At this time biopsy of a cervical lymph-node was done and was reported as showing "chronic granulation tissue—non-specific." The patient then received radiotherapy over various groups of lymph-nodes at intervals of one to two weeks for a period of two and a half years. While under treatment many glands disappeared and the growth of others was thought to have been retarded. Treatment was discontinued about four months prior to admission to the hospital.

The inguinal lymph-nodes became enlarged two years after the appearance of the first cervical node. This was followed by recurring swelling of the scrotum lasting two or three weeks, without urinary disturbances. During the past year there was severe constipation present for weeks at a time; it was relieved by cathartics. There were also periods of marked abdominal distension, especially after meals, accompanied by belching and occasionally by vomiting.

Two months before admission, a specimen of skin was reported as showing lichen planus. A blood examination at that time showed: hemoglobin, 55 per cent; white blood cells, 9,000; polymorphonuclear neutrophils, 91 per cent.

The only significant fact in his past history was that at the age of nineteen, during a life insurance examination, he was found to have a blood pressure of "160."

Examination. The patient was well developed and well nourished. He showed a marked pallor, and a generalized adenopathy, involving the cervical, supraclavicular, axillary, epitrochlear and inguinal lymph-nodes.

The spleen was palpable. Though the abdomen was distended, a firm, irregular mass could be felt in the upper abdomen on both sides. The scrotum was edematous. The skin was diffusely pigmented, and was considerably thickened over the lower extremities. A papular eruption was present over the face, back and chest, which the dermatologist believed consisted of the following lesions: (1) acne; (2) papules on the face, back and chest suggesting prurigo lymphatica of the type associated with Hodgkin's disease; and (3) small, white papules suggestive of lichen nitidus. Small retinal hemorrhages were present in the fundi. The blood pressure was 175 systolic and 110 diastolic.

Laboratory Findings. The blood hemoglobin, 50 per cent; red blood cells, 2,600,000; white blood cells, 22,000; polymorphonuclear neutrophils, 95 per cent. There was no eosinophilia.

Blood chemistry: Urea nitrogen, 81 mg.; sugar, 90 mg.; calcium, 8.5 mg. per 100 cc.

Urine: A trace of albumin, a few pus cells and a rare blood cell; concentration fixed at 1010; phenolsulphonphthalein excretion less than 20 per cent in two hours; Congo-red test indicated 30 per cent absorption in one hour—a normal finding.

The blood Wassermann test was negative. An axillary gland was biopsied and reported as showing Hodgkin's disease. A skin specimen was reported as *Lymphadenosis cutis circumscripta.*

Cystoscopy. Indigo carmine excretion of poor concentration was obtained from the right ureter in 40 minutes; none from the left. An obstruction was encountered in the right ureter at 10 cm. It was finally passed with the result that there appeared a rapid flow of 90 cc. of clear fluid. A similar obstruction was met also in the left ureter at 15 cm. but could not be passed. The catheterization of the right kidney was followed by a diminution in the blood urea. On the eighth day after cystoscopy, the patient experienced a sudden, severe pain in the right lumbar region, radiating forward, and soon went into shock. His skin became clammy; the pulse rate increased rapidly to 140, and the abdomen became markedly distended. There was, however, no obliteration of liver dullness. The patient's condition became steadily worse, and death occurred in 24 hours from what was thought to be a paralytic ileus. For some days before death, there had been a continuous drop in blood pressure, reaching 110 systolic and 70 diastolic, and there had been a gradual increase in the urea and creatinine content of the blood.

Necropsy Findings. Hodgkin's disease of the spleen and of the superficial, peripancreatic, periportal, periaortic, mesenteric and omental lymph nodes. The left ureter in its upper third, and the right ureter in the lower third, were infiltrated by Hodgkin's tissue with resultant stenosis and bilateral hydronephrosis and pyelonephritis. Paralytic ileus. Enlargement of heart due to hypertrophy of the left and right ventricle.

COMMENT

This patient showed a very rare, if not unique, instance of infiltration of the ureters by the granulomatous tissue of Hodgkin's disease. The elevated blood pressure probably was not related to the pathological kidney condition.

A few lines may be devoted to a brief resumé of some of the interesting but less commonly known facts about this disease.

Duration. Average, two to three years, but several acute cases have been described with a time span of four to eight weeks from the initial symptom to exitus. In these instances there was, of course, no way of telling how long the disease may have been dormant. In a chronic form the disease has been known to last eight, ten and thirteen years, and, in a single case, twenty-five years. This last, however, was described at a time when the diagnostic criteria were not well formulated.

Occurrence. Most common in young adults, and two and a half times as often in males as in females, due, as some observers think, to a protective influence of the ovarian secretion. The disease usually does occur in children under five years of age, though it has been reported in an infant of four months. In one undoubted instance, an infant born of a mother suffering with the disease succumbed with the picture of Hodgkin's disease in the first few months of life.

Blood Picture. There are no characteristic blood findings, though marked variations in the blood picture are encountered as a result of radiation therapy, the localization of the Hodgkin's tissue in the hematopoietic system, or the onset of secondary infection, etc.

Organs Involved. Lymph-nodes. Early in the disease, the picture of an involved lymph-node is immature and not characteristic. This indefiniteness may last for months. Aside from the spleen and lymph-nodes, the *lungs* and rarely the pleura are affected. The *larynx* may be involved.

Infiltration of the *liver* parenchyma may cause jaundice due to actual involvement of the wall of the smaller or larger bile ducts, whether intra- or extrahepatic, or from pressure on the larger ducts by lymph-nodes outside the liver.

The Gastrointestinal Tract. Aside from symptoms resulting from pressure of retroperitoneal, mesenteric and omental lymph-nodes, there may be actual involvement of the wall of the stomach, small or large intestines. This infiltration may ulcerate, causing hemorrhage and perforation, or simulate an enteritis or colitis. In the stomach, it may give all the findings characteristic of a carcinoma.

The Skeleton. There may be an invasion of the bone marrow with the most extreme variations in the blood findings. If the cortex is involved, with the formation of new bone, there may be a picture simulating neoplasm or osteomyelitis.

The Skin. There may be all the gradations from a severe pruritus existing in normal skin to the most bizarre morphologic changes Some writers consider the pruritus as due to a direct toxic effect on the skin, while others consider it the result of a disturbed autonomic nervous system. The pigmentation, in Rolleston's opinion, is also due to this and not to an involvement of the adrenals—a questionable occurrence.

Central Nervous System. Primary involvement, in the sense of deposits of Hodgkin's tissue, is practically unknown. The spinal cord, its nerve roots, and, less often, the brain are affected by pressure or direct extension of the Hodgkin's tissue from adjacent structures. As a result, symptoms of localized or diffuse character may arise.

REFERENCES

Hayden, H. C., and Apfelbach, C. W.: Gastrointestinal Lymphogranulomatosis. Arch. Path. & Lab. Med., 4: 743, 1927.

Wallhauser, A.: Hodgkin's Disease. Arch. Path., 16: 522, 672, 1933.

PERIARTERITIS NODOSA

Report of a Case

D. ALFRED DANTES, M.D.

[*Services of Dr. George Baehr and Dr. Edwin Beer*]

A correct clinical diagnosis of periarteritis nodosa is not often made. In a case reported by Dr. Manges and Dr. Baehr in 1919[1] the diagnosis was made at operation by Dr. L. Buerger who observed nodes on the mesenteric arteries. In the last twelve cases of this disease that have come to necropsy in this hospital, the diagnosis of periarteritis nodosa was suggested only in one case clinically (Dr. Edwin Beer).

It seems of some value, therefore, to report a case of this disease in which the correct diagnosis was made on clinical grounds alone upon admission of the patient to the hospital.

CASE REPORT

History (H. N. 367887). The patient was an Italian male, 21 years old, who denied ever having been previously ill. Six months before admission to the hospital he had intermittent pain and swelling about the left ankle for several weeks. He lost appetite, weight, and strength. He nevertheless continued at his occupation as hat-maker until six weeks before admission when he felt very weak and sought the advice of a physician. It was then found that the patient had a moderate rise in temperature. Within a few days he developed pain and swelling also in the right ankle, followed shortly by a similar affection of the knees, elbows, shoulders, and left wrist. He was given a course of six intramuscular injections (the nature of which could not be ascertained) and after a month in bed was pronounced cured. He, nevertheless, was so weak that he was forced to remain in bed. He had no headache, edema, or urinary disturbances of any kind.

One day before entering the hospital he was suddenly seized with a very severe, sharp, cutting pain in the right costovertebral region, radiating anteriorly to the right upper quadrant of the abdomen but not downward or upward. Shortly after this he voided a small amount of dark urine. The pain continued for several hours, diminishing only slightly in intensity. Eighteen hours later there was a recurrence of the sharp right costovertebral pain.

Physical Examination. The patient was thin and extremely pallid. He

[1] Baehr, G.: Periarteritis Nodosa. Proc. N. York Path. Soc., 19: 131, 1919.

complained of pain in the right loin. There was a mottled, pinkish, macular eruption on the forehead. The temperature was 98.8°F., pulse 110, respirations 18. The fundi showed indistinct disc margins with a grayish zone surrounding each nerve-head; the arteries were markedly constricted; there were several recent hemorrhages and exudates in each fundus. There were no other neurological findings. A chain of shotty lymph-nodes in the left posterior triangle and a few small lymph-nodes in the left axilla and both groins were present. The chest and lungs were normal. The heart was not enlarged. The first sound at the apex was snapping and forceful. The A_2 was louder than P_2. There was a soft systolic murmur along the left sternal border. There was marked sclerosis of the radial and brachial arteries. The blood pressure was 190 systolic and 130 diastolic. The abdomen was slightly distended. There was moderate tenderness in the right upper quadrant and upper half of right loin with marked involuntary rigidity which prevented deep palpation of these areas. There was moderate punch tenderness in the right costovertebral angle.

The clinical diagnosis on admission was: Periarteritis nodosa with infarction of the right kidney.

Laboratory Data. The hemoglobin was 52 per cent, the red blood cells 3,200,000 per c.mm., the white blood cells 38,500 with 93 per cent polymorphonuclears, 5 per cent lymphocytes, and 2 per cent mononuclears. The urine showed two plus albumin, innumerable red blood cells, and rare granular and hyaline casts; the specific gravity was 1.014. The blood Wassermann was negative. The blood urea nitrogen was 22 mg. per 100 cc. The electrocardiogram showed no definite abnormality.

Course. On the day after admission it was noted that though the pain was diminishing there appeared a slight but definite bulging in the right costovertebral region. There was no significant rise in temperature, but the tachycardia continued. X-ray examination revealed a scoliosis with convexity away from the affected side and obliteration of the right psoas shadow. It was the opinion of the consulting surgeon that the clinical and roentgenological findings were characteristic of perforated cortical abscess of the kidney. He suggested that an excretory urogram be made and that if it confirmed the above findings, immediate operation be performed. The test revealed marked compression and mesial displacement of the right kidney pelvis; the kidney shadow itself was obscured by a large mass (fig. 1). Since all these findings were consistent with the diagnosis of perirenal suppuration, surgical interference was thought advisable.

Operation was carried out through a lumbar incision. The perinephric space was found to be the site of a large hematoma. Much of this was evacuated. An actively bleeding cavity about $1\frac{1}{2}$ cm. in diameter was found in the anterior surface of the kidney, near the hilus. It was packed and the wound closed.

During the few hours immediately following operation, the patient's pulse was very rapid and the blood pressure dropped to 102 systolic and 70 diastolic. While preparations for transfusion were being made, the patient suddenly sat up, screamed, vomited, and lapsed into coma, as though some vascular insult had occurred. He died seven hours after operation.



FIG. 1. Excretory urogram showing: compression and mesial displacement of right kidney pelvis; large mass obscuring right kidney region.

Necropsy Findings. The arteries of the heart, liver, kidneys, large and small intestines, stomach, gall-bladder, diaphragm, testicles, and an isolated larger vessel of the brain showed periarteritis nodosa. The lesions were found in all stages of development, varying from the very earliest microscopic arterial lesions to large, firm, pea-sized, aneurysmal nodules. There were multiple recent and old infarcts of the kidneys and liver and a massive right retroperitoneal hematoma, the result of a renal infarction (fig. 2). The heart showed a moderate degree of hypertrophy and dilata-

tion. The mitral valve displayed fibrosis which was regarded as nonrheumatic in origin.

The immediate cause of death was found to be pulmonary edema secondary to circulatory failure.

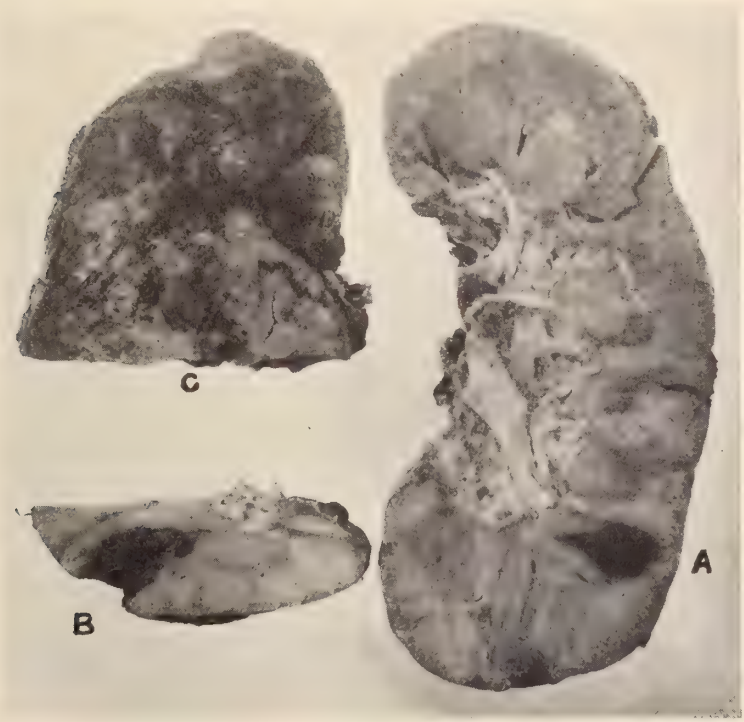


FIG. 2. (*A*) Right kidney; the dark area is an infarction due to a ruptured aneurysm. (*B*) Right kidney showing point of rupture. (*C*) Remnant of extensive subcapsular hematoma.

DISCUSSION

This case illustrates well that the disease under consideration is usually a diffuse one, involving the arteries of many organs, and hence affects the structure and functions of such organs. Its manifestations and symptomatology, therefore, are protean and often very complex. Furthermore, in contrast to nearly all other diseases of the arterial tree, it is relatively acute in its onset. This accounts for the term, "Polyarteritis Acuta Nodosa," which was introduced by Osler in his Textbook of Medicine.

In many respects periarteritis nodosa closely resembles the so-called malignant phase of essential hypertension, from which condition it must at times be differentiated.

In our case it was apparent at the time of admission that we were dealing with a subacute disease on which was superimposed an acute episode. The sclerosis of the peripheral arteries, the marked changes in the fundus oculi, the arterial hypertension, and the sharply accentuated aortic second sound served as evidences of the existence of a diffuse arterial disease.

The history of only six months ill health, the entirely negative past history, and the finding of a relatively small heart in the presence of a marked arterial hypertension strongly suggested that the arterial disease was of recent origin. It seemed unlikely, therefore, that we were dealing with chronic glomerulonephritis. Hence the possibilities seemed to narrow themselves down to *malignant nephrosclerosis* or *periarteritis nodosa.*

Assuming the presence of either form of vascular disease, the recent episode of sudden right loin pain, followed by the passage of dark urine and the finding of definite tenderness and spasm in the region of the right kidney naturally suggested the occurrence of a major vascular accident (infarction) in the right kidney, especially since the patient was afebrile.

It was realized that such an episode was perfectly compatible with the diagnosis of periarteritis nodosa and that it was less apt to occur in the course of malignant nephrosclerosis. Furthermore, the alleged occurrence of arthritis at the onset of his illness and the presence of tachycardia also favored the diagnosis of periarteritis nodosa.

Observation during the patient's brief stay in the hospital disclosed further evidence in support of the diagnosis of periarteritis nodosa with renal infarction, namely, the finding of large numbers of red blood cells in the urine, the persistent tachycardia, and marked leucocytosis with high polynuclear leucocyte count in the absence of fever.

The absence of fever and the necessity of assuming the presence of two unrelated disease conditions seemed to us to render the diagnosis of ruptured cortical abscess of the kidney extremely unlikely. Finally, it appeared to us that the classical clinical and X-ray signs of perinephritis could have been produced by extravasated blood, which supported the diagnosis of infarction.

ECTOPIC CHORIOEPITHELIOMA[1]

I. E. GERBER, M.D.[2]

[*From the Division of Laboratories*]

Chorioepitheliomatous metastases without a demonstrable primary tumor have been reported in both males and females. Prym (1) reported such a case in a male. The right testis contained a mass of scar tissue, and the author looked upon this as evidence of spontaneous regression of the primary tumor. Other observers (2) have described the occurrence of chorioepitheliomatous metastases in women after gestation, in whom examination of the uterus and adnexae at necropsy revealed no evidences of a primary tumor. In such instances the possibility may be entertained that the primary tumor in the uterus underwent spontaneous regression. Case 1 illustrates the occurrence of chorioepitheliomatous metastases in a nulliparous female, without a demonstrable primary tumor.

CASE 1

History (H. N. 369450). A white female, age 31, was admitted to the Thoracic Service of Dr. H. Wessler on August 2, 1934, complaining of persistent cough of five months duration. The patient's past history was negative except for the presence of irregular menses during the past two years. There was no history of pregnancy. About five months prior to her admission to the hospital the patient developed a distressing, nonproductive cough unaccompanied by fever. The cough abated in several weeks but soon recurred and persisted to the time of admission. Occasionally the patient expectorated blood-streaked sputum. On June 10, 1934 she was examined at another hospital where the diagnosis of pulmonary neoplasm was made. The patient was advised to enter The Mount Sinai Hospital for removal of the neoplasm.

Examination. At the time of admission the patient had the appearance of a well developed woman in apparent good health. There was slight suppression of breath sounds over the left infraclavicular region. The heart sounds were of good quality. X-ray examination of the chest revealed a large, sharply demarcated, lobulated mass in the posterior portion of the left chest extending from the fifth to the ninth ribs posteriorly. It was not possible to determine from the X-ray examination whether the

[1] Presented before the Clinical Pathological Conference, The Mount Sinai Hospital, October and November, 1934.

[2] George Blumenthal, Jr., Fellow in Pathology.

mass represented a primary or metastatic lesion. Five days after admission examination of the pelvic organs revealed a somewhat enlarged uterus, tender on motion. There was free bleeding from the uterine cavity; the patient was not menstruating. At this time a primary chorioepithelioma of the uterus with metastases to the lungs was suspected, and it was suggested that the Aschheim-Zondek test be performed. This was subsequently (after death) reported positive. On August 9th the patient was



FIG. 1. Metastatic chorioepithelioma of the left lower lobe with stenosis of the left lower lobe bronchus.

subjected to bronchoscopy. This showed a stenosis of the left main bronchus; there was fresh bleeding from the wall of the bronchus at this site. Immediately following biopsy the patient began to bleed profusely and despite emergency measures expired several minutes later.

Necropsy Findings. Chest: The left lung was firmly attached to the chest wall by adhesions of the parietal and visceral pleurae. About one-half of the left lower lobe was occupied by a mass. The surrounding lung parenchyma was markedly compressed (fig. 1). The mass was oval in

shape, firm and well demarcated from the lung tissue; it measured 6 cm. in width and 5 cm. in depth. On section the surface was of a greenish-gray color, granular and presented a honeycombed appearance. The central portion of the tumor was necrotic and the edges markedly hemorrhagic. Within the upper lobe on the same side a cluster of small tumor nodules was felt, the aggregate mass measuring about 3 cm. in diameter. On section the nodules resembled the main tumor mass. Both lower lobe bronchi were filled with fresh blood. There was atelectasis of both lower lobes.

The genital tract: The uterus was normal in size and appearance. The endometrial cavity was clean, the endometrium pale. The right ovary contained a cyst about 3 cm. in diameter, the contents of which were clear. No corpora lutea were present in the ovaries. The tubes were normal in appearance.

No significant changes were found in the remaining organs.

Microscopic Anatomy. The lung tumor was cellular and showed extensive areas of necrosis and hemorrhage. The tumor cells consisted of two main types. One type of cell was polyhedral and possessed an abundant basophilic, vacuolated cytoplasm with a large nucleus in which the chromatin was clumped along the margins of the nuclear membrane. These cells were arranged in the form of broad nests or plaques. Occasional mitoses were present. The second type of cell consisted of a large, irregularly outlined cell with abundant acidophilic cytoplasm and multiple large hyperchromatic nuclei. These cells, forming a syncytium, were seen to lie along the margins of the nests formed by the first type of cell. The two cell types conformed, morphologically, to the Langhans and syncytial wandering cells seen in young placental tissue. There was no distinct capsule; the edges of the tumor were surrounded by compressed alveoli and septa. The tumor contained very little fibrous stroma. Numerous widely dilated and congested vascular channels were present throughout. Within the necrotic areas remnants of alveolar elastica were identified with the Weigert stain.

No tumor was found in any of the other organs. Careful investigation of the uterus, tubes, and ovaries failed to reveal any evidences of tumor or other significant changes. The cyst in the ovary presented no unusual findings. Sections of breast showed normal acini; there were no evidences of recent involution.

COMMENT

The occurrence of chorioepitheliomatous metastases in this case, in the absence of a primary tumor, may be explained by the assumption of a previous pregnancy terminated by spontaneous abortion. During the course of such a pregnancy chorionic villi may have been transported to the lung, with subsequent malignant transformation. It has been demon-

strated by Schmorl (3) that chorionic villi may be transported to the lungs during a normal pregnancy, and he believed that such villi at times may undergo malignant transformation. The author described an instance of chorioepithelioma arising eighteen weeks after the completion of a normal pregnancy; at necropsy no tumor was found in the uterus. A number of other investigators (4) share the view that transplantation of chorionic villi may occur during pregnancy. They cite instances in which the removal of vaginal tumors consisting of transplanted villi with syncytium and Langhans cells was followed by recovery. Thus, they regarded the vaginal tumors as transient proliferations of transplanted chorionic villi. Walthard (5) and others have shown, however, that such tumors are not always benign, since their removal did not preclude the occurrence of metastases with fatal issue.

A second possible explanation as applied to Case 1 is that the chorioepithelioma may have developed in a previous pregnancy, which may have been aborted, carrying with it most of the primary tumor while the residual tumor in the uterus healed, but the metastases in the lung remained. This view is supported by the reports of several observers (6), who described chorioepitheliomatous metastases after completion of normal gestation and found no tumor in the uterus at necropsy.

There is still a third possibility, that of a chorioepitheliomatous transformation of a preëxisting teratoma of the lung. However, teratomas of the lung are extremely rare, while thoracic teratomas usually are situated in the mediastinum. In this instance the tumor mass was situated within the lung and in no way connected with the mediastinum.

CASE 2

Extragenital or ectopic chorioepitheliomas in males are considered to develop from germinal rests or as malignant transformations of teratomas. The germinal rests or teratomas are most commonly found in the mediastinum or in the retroperitoneal region along the course of the urogenital anlage. The concept of the origin of chorioepitheliomas from misplaced testicular rests has recently received additional support in the findings of Staemmler (7) who reported the occurrence of such rests in the retroperitoneal fat at the root of the mesenteric vessels. He believes that they represent rests of the *plica urogenitale*. Inasmuch as the plica urogenitale extends from the sixth thoracic to the second sacral segment in the embryo, the author believes that germinal rests also may be found in the mediastinum in the adult.

The following case represents an instance of ectopic chorioepithelioma in a male, probably arising from a germinal rest.

History (H. N. 371130). A white male, age 23, was admitted to the Medical Service of Dr. B. S. Oppenheimer on September 20, 1934. His past history was negative. About 2 weeks prior to admission the patient,

while at work in the rain, was struck on the right side of the body. The following day he felt sharp pains in the right flank; this was in turn followed by pain over the front of the chest and in the right axilla with cough and expectoration of blood-tinged sputum.

Examination on admission revealed an acutely ill, dyspneic individual. There were dullness, diminished breath sounds and absence of fremitus over both bases. Scattered, high pitched, crackling râles were heard over both lower lobes. A firm, slightly tender, irregular mass about the size of an orange was palpated in the right lower quadrant of the abdomen, just above Poupart's ligament. The genitalia were negative. A diagnosis of bronchopneumonia and traumatic retroperitoneal hematoma was made. X-ray examination of the pelvic bones was negative. Eleven days after admission there was noted edema of the right lower extremity; this was attributed to obstruction of the corresponding iliac vein by the retroperitoneal mass. An X-ray examination of the lungs two weeks after admission was reported as showing numerous round, sharply demarcated opacities throughout both lungs; these were considered to be metastatic tumor nodules. The pelvic mass was now thought to be a retroperitoneal sarcoma. The patient developed increasing dyspnea, thrombosis of the left internal saphenous vein and gangrenous hemorrhoids. He died on October 20, 1934, one month after admission.

Necropsy Findings. A mass, about the size of a grapefruit, was found lying over the right iliopsoas muscle behind the peritoneum (fig. 2). The mass had enveloped and obstructed the right ureter with consequent dilatation of the proximal portion of the ureter and the kidney pelvis. Below, the tumor had penetrated the peritoneal cavity and was adherent to a small loop of ileum. Posteriorly, the mass was firmly attached to the iliopsoas muscle and the fascia and had invaded the right common iliac vein. The latter contained a firm thrombus which extended into the left common iliac vein. The tumor mass on section presented a reddish-gray color; it was friable, granular and honeycombed. Areas of hemorrhage and necrosis were present throughout the tumor mass.

The entire genital tract was dissected out with care and found to be grossly normal; there was no connection between the tumor and any portion of the genital tract.

Each pleural cavity contained about a liter of serosanguineous fluid. The pleural surfaces of both lungs were covered everywhere by a fibrinous exudate. Both lungs were studded with tumor nodules; these varied in size from 0.5 cm. to 3 cm. in diameter. The nodules bulged above the surface of the lungs and were sharply demarcated from the lung parenchyma. On section the nodules presented an appearance similar to that found in the main tumor mass. Very small, scattered metastatic tumor nodules were also present in the liver, kidneys and spleen. The remaining organs showed no significant alterations.

The Aschheim-Zondek test was performed on urine obtained at post mortem and reported positive in high dilutions.

Microscopic Anatomy. The tumor had no distinct capsule. It was cellular and had extensive areas of hemorrhage and necrosis. The tumor cells consisted of two distinct types. One type resembled the Langhans cells of normal placental tissue (fig. 3). The cells were large, polyhedral in shape and were grouped in broad nests or plaques. Their cytoplasm



FIG. 2. Primary retroperitoneal chorioepithelioma. Arrow points to ureter infiltrated by tumor.

was basophilic, abundant and vacuolated; their nuclei were large. Occasional mitoses were present. The other type of cells found along the margins of the broad cell nests resembled the syncytial wandering cells of pregnancy. They were large, irregular, often angulated and possessed an abundant acidophilic cytoplasm with multiple large hyperchromatic nuclei. Mitoses were also seen frequently. No cilia were present in these cells. Careful search of the tumor sections revealed no teratomatous elements.

The metastatic nodules in the lungs, liver, spleen and kidneys presented a similar histologic appearance.

Histologic studies of the prostate, seminal vesicles, vas deferens and testes revealed no changes. There was no hyperplasia of the interstitial cells in the testes as reported by Kantrowitz (8) and others. The changes in the other organs were not significant.

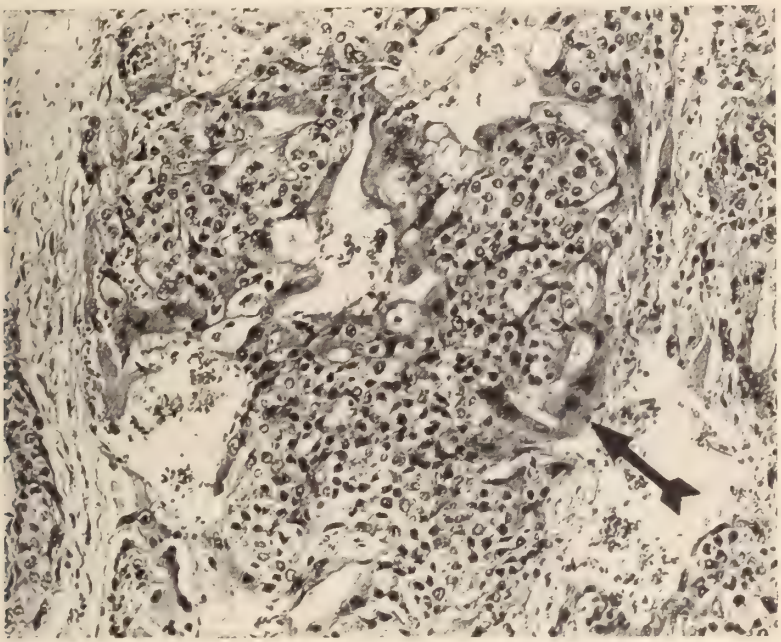


FIG. 3. (Case 2.) Low power view of the tumor. Arrow points to multinucleated syncitium surrounding the nests of polyhedral, clear cells (Langhans type).

COMMENT

Kantrowitz (8) reported a case of chorioepithelioma in a male that developed from a teratoma of the mediastinum. Examination of the testes by serial sections disclosed no tumor. Teratomatous elements were present in the primary mediastinal tumor. A review of the literature on the subject revealed four other unquestioned instances of ectopic chorioepithelioma in males. All of these cases, including the one described, satisfied all of the criteria established by Prym (9) for the demonstration of the extragenital origin of the primary tumor. In no instance was there any evidence that the tumor might have arisen from the genital tract. Case 2 is an additional instance of unquestioned ectopic chorioepithelioma.

In view of the above discussed findings of Staemmler, it would appear

that the occurrence in males of chorioepithelioma of extragenital origin is not as unlikely as Prym believed.

REFERENCES

(1) Prym, P.: Spontanheilung eines boesartigen wahrscheinlich chorionepitheliomatoesen Gewaechses im Hoden. Virchows Arch. f. path. Anat., 265: 239, 1927.
(2) Ewing, J.: Neoplastic Diseases, Ed. 3, Philadelphia, W. B. Saunders Co., 1928, p. 608.
(3) Schmorl, G.: Cited by Ewing.
(4) Ewing, J.: Op. Cit.
(5) Walthard M.: Zur Aetiologie der Chorionepitheliome ohne primaer Tumor in Uterus. Ztschr. f. Gynäk., 59: 443, 1907.
(6) Kaufmann, E.: Pathology for Students and Practitioners. Philadelphia, P. Blakiston's Son & Co., 1929, Vol. 3, p. 1739.
(7) Staemmler, M.: Untersuchungen ueber ueberzaehlige Hodenanlagen in der Bauchhoehle. Verhandl. d. d. path. Ges., 27 Tagung: 190, 1934.
(8) Kantrowitz, A. R.: Extragenital Chorionepithelioma in a Male. Am. J. Path., 10: 531, 1934.
(9) Prym, P.: Zur Frage der extragenitalen Chorionepitheliome beim Manne. Zentralbl. f. allg. Path. u. path. Anat., 49: 98, 1930.

THE ROENTGEN EVIDENCE OF PREËXISTENT SCURVY[1]

MORRIS F. STEINBERG, M.D., AND MARCY L. SUSSMAN, M.D.

[*From the Radiological Service of Dr. L. Jaches and the Consultation Service of the Hospital (Dr. George Baehr, Director)*]

The clinical picture and roentgen findings in scurvy are well known. But the fact that this disease may leave residua readily identified roentgenologically many years afterward as pathognomonic of its preëxistence is not as widely recognized. This was first demonstrated by Wimberger (1) in 1924. He followed cases of scurvy by frequent roentgen examinations and was able to demonstrate lesions in the epiphyseal centers of ossification over a period of four to five years after the clinical cure of the disease. These lesions consist of oval, sharply circumscribed, cystic areas. They are usually found somewhat eccentrically placed within the zones of ossification, nearer the diaphyseal than the articular margin of the epiphysis. The bilateral symmetry of these lesions is quite characteristic. Köhler (2) mentions these lesions briefly. Schwartz (3), Bromer (4) and McLean and McIntosh (5) have reported instances in which preëxistent scurvy was shown roentgenologically four to twelve years after the cure of the active process. Rosenblum (6) has drawn attention to Wimberger's original work and has observed a larger number of cases over a long period of years by repeated roentgen examinations.

The present case is reported in order to reëmphasize the importance of these lesions which have often been misinterpreted, notably as bone cysts.

CASE REPORT

History (C. S. 1788). A boy, aged four years, was referred to the Consultation Service of the hospital because of enuresis and pyuria. The past history was significant in that at the age of six months the child developed rickets and scurvy. He was treated adequately and recovered within the following year. He continued to be apparently well except for the enuresis until one year before admission when he began to have fever and "pus in the urine". A retrograde pyelogram revealed an enlarged trabeculated bladder and marked dilatation of both ureters and the kidney pelves. This was thought to be the result of a congenital contracture of the bladder neck. The incidental finding of peculiar cystic areas in the centers of ossification of both femora (fig. 1) led to a study of the knees and wrists

[1] Presented at the Monthly Departmental Conference of the Radiological Service, September 1933.

which showed similar lesions (fig. 2). The diagnosis of preëxistent scurvy was then made and was later corroborated by the clinical history.



FIG. 1. Arrows point to cystic areas in centers of ossification of the femora

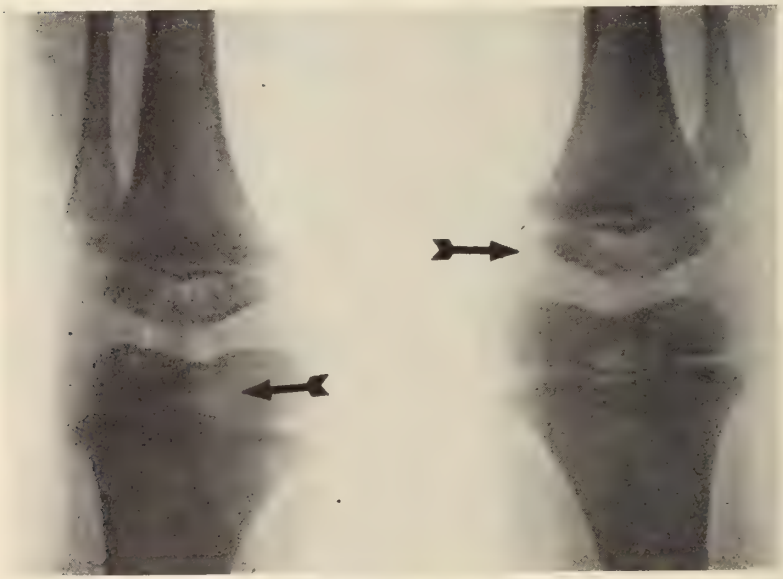


FIG. 2. Cystic areas in centers of ossification at the knees. Note sharp outlines and eccentric location.

COMMENT

It is interesting to note that the cystic areas are seen only in those centers of ossification which were partly ossified at the age when the active disease process occurred. Thus, in this case, the proximal epiphysis of the fibula, a center of ossification which usually appears at the age of four years, was not involved, because the scurvy occurred at the age of six months.

The blood supply of the epiphysis of the long bones is entirely independent from that of the diaphysis. It is also well known that this blood supply is not a very rich one. Healing of the scorbutic process presumably proceeds at a much more rapid rate in the diaphysis and is completed in a relatively short time. The inadequate blood supply of the epiphysis results in an incomplete ossification which manifests itself as a cystic area within the normally growing epiphysis. The latter characteristically grows in all directions except toward the diaphysis, which explains the eccentric location of the lesion within the center of ossification. Upon the union of the epiphysis with the diaphysis of the bone (17 to 18 years of age at the knee), there is a concomitant enrichment in the blood supply of the former and, according to Rosenblum (7), the lesion entirely disappears. However, the mark of the preëxistent attack of scurvy is indelibly imprinted in the bones of the patient until that time.

REFERENCES

(1) Wimberger, H.: Die Spätdiagnose des Säuglingsskorbuts. Fortschr. a. d. Geb. d. Röentgenstrahlen, 32: 17, 1924.

(2) Köhler, A.: Roentgenology: The Borderlands of the Normal and Early Pathological in the Skiagram. English translation by Arthur Turnbull. Baltimore, Wm. Wood & Co., 1928.

(3) Schwartz, A. B.: The Epiphyseal Changes in the Diagnosis of Scurvy. Am. J. Dis. Child., 34: 765, 1927.

(4) Bromer, R. S.: Roentgen-ray Diagnosis of Infantile Scurvy. Am. J. Roentgenol., 19: 112, 1928.

(5) McLean, S. and McIntosh, R.: Healing in Infantile Scurvy as Shown by X-ray Am. J. Dis. Child., 36: 875, 1928.

(6) Rosenblum, J.: Scurvy—A Study. Address before the Pediatrics Section, Kings County Medical Society, September 1932.

(7) Personal communication.

ABSTRACTS

Authors' Abstracts of Papers Published Elsewhere by Members of The Mount Sinai Hospital Staff

Lipolytic Enzymes. I. Studies on the Mechanism of Lipolytic Enzyme Action. II. The Influence of Hydrogen Ion Concentration on Activity of Liver Esterase. Harry Sobotka and David Glick. J. Bio. Chem. 105: 199, April 1934.

The activity of liver and pancreas lipolytic enzymes on a series of simple esters, diesters and triglycerides was measured. Liver esterase and pancreas lipase differ from each other (1) by their physiologic function, (2) by the nature of the protein fraction with which they are associated, (3) by their substrate specificity, (4) by the type of their kinetics and (5) by the influence of foreign substances such as bile acids on their action. Liver esterase and pancreas lipase, however, follow similar pH-activity curves. The accelerating and retarding influence of surface active substances such as octyl alcohol can be demonstrated for both enzymes by varying the concentration of substrate and octyl alcohol. The results allow conclusions to be drawn regarding the structure of the enzyme particles.

Depersonalization in Relation to Erotization of Thought. C. P. Oberndorf. Internat. J. Psychoanal. 15: 271, April–July 1934.

The author states that erotization of thought may progress to the point where it hampers thinking. When thought is excessively erotized, the process of thinking has been identified as a characteristic of the parent of the opposite sex. Such identification places the function of thinking in the category of a masculine or feminine attribute. When the patient attempts to repress thinking as a sexual characteristic incompatible with his or her own biological destiny, the repression gives rise to the feeling of a loss of a part of the personality. Such a loss registers in the feeling of depersonalization. A lengthy case report is given which furnishes material supporting this theory.

NOTICE

The new edition of "The Mount Sinai Hospital Manual of Procedures for the House Staff" has recently been received from the printer. The manual consists of 102 pages with illustrations and is a useful, up-to-date, practical work on clinical pathology and the technic of therapeutics as carried out at the Hospital. It should be in the hands of every member of the Staff. A nominal charge of one dollar will be made to cover part of the cost.

VOLUME II NOVEMBER-DECEMBER, 1935 NUMBER 4

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

CONGENITAL MALARIA

BELA SCHICK, M.D., AND MARTIN STEIN, M.D.

The thesis that malaria may occur as a congenital disease requires for its proof the rigid exclusion of avenues of postnatal infection, as well as the presentation of direct or indirect evidence for the intra-uterine transmission of the infection. The literature presents many cases which tend to show, more or less conclusively, that an infant may be born harboring the malarial plasmodia, even in the absence of malarial conditions in the extra-uterine environment. Such, indeed, is the prevailing opinion.

As early as 1858, Duschek (1) found malarial pigment in the organs of a child dying three hours after delivery from an infected mother. Bazin (2) in 1871 described a new born infant exhibiting all the clinical features of the disease. The first demonstration of the parasites in the blood of a newly born child was that of Crandall (3) who in 1893 reported a case of an infant with a typical paroxysm 18 hours after birth. In this child, tertian forms were found on the third day of life. In the past thirty odd years, many cases have been described as belonging to this group of congenital paludism. The literature has been reviewed at length many times, especially in the writings of Meara (4), Forbes (5), and Ter-Ossipian and Markerian (6). Of all these cases, a large group can be differentiated in which plasmodia were found in the cord blood or in the organs of still born children (7). Another, the largest group, contains those cases in which the demonstration of the organisms took place within a few hours after birth (8). A third group includes those children in whom symptoms and positive blood films were found during early infancy (9).

The third group includes cases in which the possibilities of extra-uterine infection, though greater because of the longer contact with the outside world, have been shown to be most remote, because of the entire improbability of a malarial environment. It is to this group that the case to be presented by us belongs.

CASE REPORT

History (H. N. 350194). This child was born in Brooklyn in the middle of December 1932, and was brought to the Bronx during the next week.

Its home was in an apartment house which it never left until admission to the hospital.

The mother of the child had left Palestine 14 years previously, after having lived there for the first 15 years of her life. She had been in contact with a large malarial outbreak during her girlhood, but as far as she knew had never suffered from any febrile symptoms herself. At the time the child was admitted to the hospital, the mother was completely asymptomatic and apparently perfectly well. She had no palpable spleen and no parasites in the blood.

The child was considered perfectly healthy at birth and remained so until the age of $2\frac{1}{2}$ months, when the mother noticed that the infant's temperature was elevated. A physician found a hepatosplenomegaly at that time. The fever continued, ranging from 100° to 105°F., without any known periodicity. The baby developed a rapidly progressive pallor and was brought to the hospital with the tentative diagnosis of leukemia.

Clinical Findings and Course. The child appeared well except for marked pallor. The liver was down 3 cm.; the spleen was hard and firm-edged, extending 5 cm. below the costal margin. There were 4,000,000 red cells with a hemoglobin of 62 per cent; the white count was 12,000 with 78 per cent lymphocytes. Many malarial organisms of the quartan variety were repeatedly demonstrated in blood smears. Young schizonts predominated, but almost all stages of the sexual and asexual cycles were represented.

For the first week and a half in the hospital the child ran a fairly typical quartan fever curve though no paroxysmal attacks were ever noted. During this time, a slight but persistent cough accompanying some pharyngeal hyperemia was present. Quinine sulphate 0.03 g. ($\frac{1}{2}$ grain) twice daily was begun the second day after admission and gradually raised to 0.06 g. (1 grain) three times a day by the end of the week. The peak of each quartan rise fell gradually, and after the last rise on the eighth day following the start of quinine medication, no organisms could be demonstrated in the blood films. One week following the disappearance of the fever, the white count was 9,700 cells with 68 per cent lymphocytes. There were no plasmodia in the smears. The child's hemoglobin had risen to 78 per cent. Apart from the continued cough, he appeared perfectly well. Quinine was temporarily discontinued at this time. On that evening the child's temperature rose to 104.8°F., and after a slight remission, reached 106°F. twenty-four hours later. No explanation could be found for the rise in temperature at the time, as the blood films were repeatedly negative for the plasmodia. Shortly after the highest rise in temperature, the child died.

Post Mortem Examination. There was found a very acute and apparently very early purulent streptococcus peritonitis localized exclusively in the pelvis. No explanation is available as to how the acute peritonitis developed. The spleen was hard and firm, weighing 110 g. Despite the

absence of plasmodia, there was considerable pigment in the spleen, enclosed chiefly within large histiocytes.

COMMENT

It seems improbable to us that the child became infected with malaria postnatally, in the middle of the winter, in a thickly populated portion of New York City. The circumstantial evidence provided by the mother's past contacts seems to outweigh the absence of parasites in her blood and the lack of a palpable spleen, especially since both of these conditions have not been uniformly fulfilled in many of the other reported cases (Epstein (10)). The persistence of the quartan organism is also well known, and it is significant that tertian malaria is usually the infecting parasite in this part of the world, as contrasted with the prevalence of the quartan disease in the Near East (11). There does not seem to us to be any valid reason for excluding this case from the group of congenital malaria. We feel that in many respects this child presented a unique picture.

As has already been stated, the concept of congenital malaria is generally accepted, despite the failure in most instances to find the parasites in the blood or cords of infants born of malarial mothers. As early as 1907 Pezopoulas and Cardamitis (12) pointed out that organisms could not be demonstrated in smears made from the peripheral and cord blood, as well as from the foetal placental surfaces of a series of such infants. This was true despite the great number of parasites on the maternal side. This was subsequently amply confirmed. Later writers such as Thibault (13) and Blacklock and Gordon (14) have shown that of large series of infants born to malarial mothers, only very few show plasmodia in the blood. However, the occasional occurrence of the disease in the face of the overwhelming affirmative evidence in the literature can scarcely be questioned. The mechanism of the transfer of the parasites is still a debatable point.

The problem lies in differentiating transplacental infection in utero from actual inoculation, which would be the case if maternal and foetal blood were mixed during the delivery as a result of placental ruptures. That the placenta is the site of heavy malarial infestation is well known (15). Pezopoulas and Cardamitis (12) showed that the vascular lacunae on the maternal side of the placenta contain large numbers of trophozoites. In addition, it is known that invasion of the placenta occurs as early as the fourth month of gestation (15). It has furthermore been demonstrated (16) in malarial districts where a certain proportion of all placentas examined contain the parasites, that in many cases the peripheral blood of the woman with an infected placenta is free of the organisms. In all cases of the peripheral invasion, likewise, the placental involvement was greater.

However, as has been pointed out, many observers have failed to demonstrate the organisms on the foetal side; and coupling this fact with the known massive invasion of the maternal lacunae, they feel that the idea of

transplacental migration is very doubtful. It has also been pointed out that the white cells of the body are not used to convey the plasmodia to the foetus, because in the placental blood sinuses no engulfed organisms could ever be demonstrated (12). Concetti (17), as early as 1905, stated that infection of the foetus could take place only as a result of hemorrhage either with the foetus in the uterus or at the time of delivery. This theory is especially attractive, because it might explain the low frequency of the congenital infestation. It is known that in the hemorrhage of severe malaria the older organisms tend to cling to the vessel walls; thus, if the blood of the mother were temporarily depleted of younger forms, inoculation of the infant would be avoided. The theory of placental hemorrhage has since been advocated by other authors, notably Meara (4) and Bass (9).

The idea of transplacental transmission is very plausible and is most commonly held at the present time. In this connection, it is interesting to note that Felkin in 1889 (18) believed he had felt a paroxysm in a foetus through the abdominal wall of the mother. He thought, too, that infection could be paternal in origin, but this has been discredited by later writers (6). Ballintyne (19) described what he thought were synchronous chills in the mother and foetus. Later observers have also tended to the belief that there is a true intra-uterine disease. Laffont (20) pointed out that the disease might affect the child immediately at birth or might lie latent until varying periods after delivery. He thought that maternal infection in the latter part of pregnancy was necessary for the disease to occur in the baby. Lipscomb and Mansell (21) in 1927 also subscribed to the theory of true intra-uterine infection based on their two cases and on a review of the literature. They quote Buckingham, who in 1925 (8) found plasmodia in a smear taken from the prolapsed hand of a transversely presenting foetus. In 1931 Ter-Ossipian and Markerian (6) demonstrated changes in the villi and syncytial layers of the placentas of untreated, severely ill, malarial mothers. Levene expressed the opinion (22) that the parasite might be transmitted to the child through the blood vessels of the placenta, or through contact of the foetus with a contaminated amniotic fluid.

The theory has been entertained that the placenta will not transmit the organisms unless it has been pathologically changed by syphilis or by the severe cachexia of untreated, long-standing malaria. Schingareff (23) reported a case of simultaneous congenital malaria and syphilis. Levene (22) and Schadow (24) report cases of congenital malaria occurring in infants born of mothers who had been given malarial inoculations for general paresis. Schadow's case had had this treatment three weeks prior to the birth of the child. Alarcon (25) reported congenital malaria in single ovum twins born of a mother under neo-salvarsan treatment. Ter-Ossipian and Markerian (6) studied the placentas of malarial mothers and demonstrated definite changes, consisting of malarial pigment in the stroma of the villi in two untreated cases and considerable syncytial proliferation with

pigment in the proliferated tissue in 5 of 13 untreated cases. These authors also found by classifying their cases that congenital malaria did not occur in any of the infants of 12 treated and apparently cured women or in any of the children born to 55 women with a mild form of the disease. However, 9 of 13 women with severe malaria, some with a complicating disease, gave birth to children in whom plasmodia could be demonstrated immediately after delivery.

The occurrence of malaria in the new born child, without any clinical symptoms of the disease in the mother, has its analogy in the occurrence of congenital lues in children coming from clinically normal mothers. The latter show a positive Wassermann, to be sure, demonstrating the correctness of the Law of Colles, which tells us that the mother of a congenitally luetic child is really infected with lues. We may assume that there exists a high resistance against lues in the "Colles mother". The spirocheta pallida apparently finds a better suited culture medium in the placenta, embryo and fetus, and multiplies here better than in the mother. In this connection, it is interesting to note that with repeated pregnancies the intensity of the disease in the progeny may decrease.

We wish to call attention to an interesting observation in smallpox. It is a well established rule that a pregnant woman vaccinated against smallpox should not come in contact with a case of smallpox. The vaccine virus may invade the pregnant woman without producing smallpox in her, but in spite of her immunity the child may become infected with smallpox. At the termination of the pregnancy the child is either born dead, having been infected in utero with smallpox, or is born alive with an eruption of smallpox. Apparently the smallpox virus passes through the immune organism of the mother without being killed off and finds a good culture medium for its development in the baby. The pathogenic virus survives in spite of the immunity of the mother. Thus, the resistance of the mother against lues or malaria does not prevent the transmission of the spirochetes or malaria plasmodia to the child during intra-uterine life.

SUMMARY

(1) A consideration of the literature establishes fairly well the occurrence of malaria transmitted from the mother to the foetus either before or at the moment of birth.

(2) A case of malaria is presented which appears to be in this group, though wholly on circumstantial evidence.

(3) Despite some evidence to the contrary, it appears that transplacental migration of the parasites is made possible, or at least facilitated, by pathological changes in the placenta induced by a severe type of malaria, by syphilis, and possibly by other factors.

REFERENCES

(1) Duschek: Quoted by Hitte (7).

(2) Bazin: Fièvre Paludéene intra-uterine. Gaz. d. hôp., 44: 286, 1871.

(3) Crandall, F. M.: Malarial Fever in a Newborn Infant. N. York Polyclinic, 1: 38, 1893.
(4) Meara, F. S.: Case of So-called Congenital Malaria. Arch. Pediat., 26: 517, 1909.
(5) Forbes, R. P.: Congenital Malaria; Report of a Case in Colorado. Am. J. Dis. Child., 25: 130, 1923.
(6) Ter-Ossipian, N. and Markarian, P.: Ein Beitrag zu der Frage über angeborene Malaria. Zentralbl. f. Gynäk., 55: 2879, 1931.
(7) The following references illustrate classic cases of this group:
Dorolle, P., and Dang-Huu-Chi: Coma palustre et grossesse. Présence de Plasmodium praecox dans le sang du cordon. Bull. Soc. path. exot., 20: 589, 1927.
Dumolard and Viallet: Un Cas de Paludisme congénital. Bull. & Mem. Soc. med. d. hôp. de Par., 26: 229, 1909.
Hitte, L.: Sur le Paludisme congénital. Thèse de Montpellier, 1902.
(8) The following references illustrate cases of this group:
Buckingham, E. W.: Transplacental Malarial Infection. China Med. J., 39: 1140, 1925.
Economos, M.: La perméabilité du placenta aux hématozoaires, le paludisme congénital. Bull. Soc. d'Obst. de Par., 10: 70, 1907.
Grigorjewa, S.: Twenty cases quoted by (6).
(9) The following references illustrate cases of this group:
Bass, M. H.: Congenital Malaria. Arch. Pediat., 31: 251, 1914.
Beekel, F.: Report of a Case of Malaria in Early Infancy. Cleveland M. J., 9: 879, 1910.
Wayl, P.: Malaria Congenita. Arch. f. Schiffs- u. Tropen-Hyg., 36: 473, 1932.
(10) Epstein, J. W.: Malaria in Newborn. J. Pediat., 4: 251, 1934.
(11) Manson-Bahr, P.: Manson's Tropical Diseases. London, 1929.
(12) Pezopoulas, N. and Cardamitis, J. P.: Du paludisme congénital. Grèce méd., Syra, 8: 37, 1906.
(13) Thibault, J. K.: Congenital Malaria. J. Ark. Med. Soc., 12: 243, 1916.
(14) Blacklock, B. and Gordon, R. M.: Malaria Parasites in the Placental Blood. Ann. Trop. M. & Parasitol., 19: 37, 1925.
(15) Byam, W. and Archibald, R. G.: The Practice of Medicine in the Tropics. New York, Oxford University Press, Vol. 3, 1923.
(16) Report of the Ancon Commission—quoted by (15).
(17) Concetti, L.: Traité de Maladies de l'Enfance. Grancher and Comby. Vol. 1, 1904.
(18) Felkin, R. W.: Foetal Malaria, as Illustrated by Two Cases. Edinburgh. M. J., 34: 1101, 1889.
(19) Ballentyne, J. W.: Malta Fever in Pregnancy. Tr. Edinburgh Obst. Soc., 30: 146, 1905.
(20) Laffont, A.: Paludisme congénital et paludisme héréditaire. Thèse de Paris, 1909–1910.
(21) Lipscomb, F. M. and Mansell, R. A.: Case of Congenital Malaria. J. Roy. Army M. Corps, 49: 44, 1927.
(22) Leven, K.: Placentare Übertragung einer Impfmalaria von einer Paralytikerin auf das Kind. Monatschr. f. Kinderh., 49: 46, 1931.
(23) Schingareff: Quoted by (6).
(24) Schadow, H.: Impfmalaria als Ursache kongenitaler Malaria. München Med. Wchnschr., 78: 947, 1931.
(25) Alarcon, A. G.: La fièvre de l'atropine. Bull. Soc. de Pédiat. de Par., 28: 82, 1930.

BACTERIAL ENDOCARDITIS WITH THE CLINICAL PICTURE OF "BALL-VALVE THROMBUS" OF THE LEFT AURICLE

A Report of Two Cases

ISRAEL A. SCHILLER, M.D.

[*Service of Dr. B. S. Oppenheimer*]

Since Von Ziemssen pointed out in 1890 that an auricular thrombus occluding the mitral orifice could often be recognized during life by its clinical manifestations, this diagnosis has been made fairly frequently. The syndrome is usually encountered in patients in cardiac failure with dilated left auricles, due to mitral stenosis and auricular fibrillation. Some cases have been reported in which there was no valvular lesion, and the cardiac rhythm was regular. Recently we have observed two cases of bacterial endocarditis with occlusion of a stenosed mitral valve by vegetations, giving rise to the clinical picture commonly associated with "ball-valve" auricular thrombus. In one the diagnosis was made three days ante-mortem, while in the other the diagnosis was suggested shortly before exitus on the basis of our experience in the previous case.

CASE I

History (H. N. 371665). A married woman, aged 37, was treated in this hospital in 1927 for typhoid fever, from which she made an uneventful recovery. At that time she gave a history of frequent sore throat, and physical examination revealed evidence of mitral stenosis, probably due to rheumatic infection. Two years after her discharge from the hospital, she miscarried in the seventh month of pregnancy. She continued in fairly good health. On September 12, 1934, in the latter part of the seventh month of gestation, she was delivered of a dead fetus without instrumentation. On the fifth day post-partum the patient had a chill followed by a rise in temperature to 102.5°F. She began to cough and expectorate blood-tinged sputum, and the chills recurred daily until her admission to The Mount Sinai Hospital on October 2, 1934.

Examination. The patient was acutely ill. Her temperature was 103°F. She presented signs of bilateral bronchopneumonia. The point of maximal impulse of the heart was in the fifth intercostal space, about three centimeters beyond the mid-clavicular line. The first sound was snappy, and there were systolic and diastolic murmurs at the apex. The second pulmonic sound was accentuated and split. The rhythm was regular, the rate 120 per minute. The liver was palpable 3 cm. below the costal margin.

The feet were puffy but did not pit on pressure, and the nail beds were cyanotic. There was a profuse vaginal discharge, but the cervical os was closed; the uterus could not be clearly outlined. The arterial blood pressure was 100 mm. systolic, 70 mm. diastolic; the venous pressure 6 cm. of blood.

Course. Fever of septic type with repeated rigors persisted. The appearance of an aortic diastolic murmur while under observation, the findings of streptococcus viridans in blood cultures, and the absence of any evidence of a pelvic infection pointed to the diagnosis of a subacute bacterial endocarditis. Several days after admission numerous petechiae appeared, and pulmonary infarction occurred.

On October 15, thirteen days after admission, the patient complained of numbness and coldness in both lower extremities. Her hands and feet were found to be cyanotic, cold, and hypalgesic. The tip of the nose was also cold compared with the skin of the trunk, but was not discolored. The radial and dorsalis pedis arteries were felt pulsating. Oscillometric readings on the lower extremities showed an excursion of $\frac{1}{4}$ of a division at the ankles, $1\frac{1}{2}$ divisions at the calves, 1 division at the right thigh, and $1\frac{1}{2}$ at the left thigh. The blood pressure was 84 mm. systolic, 68 mm. diastolic, and equal in both upper extremities. The systolic and diastolic murmurs at the apex were still present, while the aortic diastolic murmur was no longer audible. On the basis of these findings a diagnosis of partial occlusion of the mitral valve, probably by vegetations, was made. Later on the same day the extremities, although still cold, appeared definitely less cyanotic, but on the following day the deep cyanosis and the subjective sensation of numbness returned. Two days later (October 17) the distal phalanx and nail bed of the right index finger assumed an intensely blue color, and both forearms and wrists appeared mottled and almost cadaveric, with a cyanotic pallor. The second and fourth toes of the left foot, and the fourth toe of the right foot became blue, cold, and shrunken, so that the overlying skin was wrinkled. The blood pressure at this time was 74 mm. systolic and 50 mm. diastolic. The acral parts were all icy cold to the touch, and the skin of the nose presented a bluish tinge. The heart sounds were distant, and all the murmurs noted previously were absent. The following day the patient was in extremis. The skin of the nose took on a reddish-blue color due to superficial necrosis. The changes in the extremities became more pronounced and progressive, involving finger after finger, beginning each time with cyanosis of the nail bed and purplish discoloration of the skin about the nail, and spreading proximally to involve the hands and wrists. The left foot also became gangrenous in its entirety. In the presence of these extensive necroses the peripheral pulses, with the exception of the right radial, remained open and palpable. The skin of the ears was not involved. The patient died on October 18, three days after the appearance of the first evidence of an inadequate peripheral circulation.

Necropsy Findings. There was gangrene of the fingers, toes, and skin of the nose.

The *heart* weighed 325 gm. The pericardial sac contained 6 ounces of a clear, straw-colored fluid. The parietal pericardium was normal in appearance. The visceral pericardium presented numerous punctate hemorrhagic spots and a small, irregular patch of fibrinous pericarditis over the left auricle. The right atrium and ventricle were somewhat dilated and hypertrophied. The tricuspid valve was moderately thickened; its chordae tendineae were slender and inserted into the valve in web-like fashion. The left atrium was greatly distended and hypertrophied, and contained a large amount of blood which spurted out when the chamber was opened. Its endocardium was thickened and puckered. The mitral orifice was considerably narrowed. On the auricular aspect of the posterior leaflet of the mitral valve an oval mass 3 cm. in length was attached, extending proximally into the atrium for about 1 cm. beyond its attached base. The lower third of this vegetation was brownish red, the upper two thirds was greyish red in color. The entire mass presented a rough, irregular, corrugated surface. The two leaflets of the valve were fused and markedly thickened. On the atrial aspect of the cusps, 8 mm. from the closing edge of the valve, there was a band-like arrangement of small wart-like excrescences in the form of a ridge. These extended around almost the entire mitral lumen, leaving a free space of 5 mm. on the left margin of the orifice. The chordae tendineae were markedly shortened and thickened, with shelf formation. There was calcification of the mitral ring. The left ventricle was small, contracted, and contained but little blood, in contrast with the dilatation of the left atrium. The closing edges of the aortic cusps were slightly thickened. The nodulae arantii were prominent, and on the posterior and left cusps they presented raised, grey-yellow, pin-point excrescences, 1 mm. in size. The coronary vessels and aorta were normal. There were no thrombi or emboli in the major divisions of the aorta.

The *spleen* was large and soft with many subcapsular infarcts. The *kidneys* also presented infarcts, a large one in the right kidney being due to embolization of a branch of the right renal artery. The uterus was large, pale, and greyish red. There was no evidence of infection in the endometrium or in the uterine venous plexus.

CASE 2

History (H. N. 372787). The patient was a housewife, 60 years of age, known to have had heart disease since early youth. She was first admitted to this hospital sixteen years ago because of hematuria. At that time mitral stenosis was diagnosed, and cystoscopy and X-ray studies of the urinary tract proving negative, the patient's symptoms were attributed to renal infarcts. She remained in good health, except for mild dyspnea on exertion, until three weeks before admission. At that time she developed an upper respiratory infection, with pains in the muscles and joints. One week later her temperature rose to 104°F., and she began to cough.

She was admitted to the hospital on October 30, 1934 because of the continued fever.

Examination. The patient was pale and appeared exhausted. There were white-centered petechiae in the conjunctivae, in the fundus oculi, and on the skin. Both lungs presented signs of congestion and bronchitis. The heart was enlarged to the left. At the apex there were harsh systolic and crescendo, rough, pre-systolic murmurs. At the base there was a rough systolic murmur, maximal over the aortic area. (The patient's physician reported that he had heard an aortic diastolic murmur on numerous occasions, but this was not audible on this admission.) There were no thrills palpable over any part of the precordial area. The liver was tender and palpable 7 cm. below the costal margin. The tip of the spleen was just palpable. There was no peripheral edema or clubbing of the fingers. The radial arteries were somewhat sclerotic.

Course. The clinical diagnosis of bacterial endocarditis was confirmed by blood cultures, which repeatedly yielded an enterococcus. The patient's temperature varied between 102° and 104°F., and her condition grew rapidly worse. The signs of pulmonary congestion increased; the patient lapsed into coma, and died on the eighth day in the hospital. About one hour before death the tips of the fingers and toes became very blue and cold, the appearance suggesting gangrene. The peripheral pulses were not palpable. The extremely rapid cardiac rate made auscultation of cardiac murmurs impossible. Because the peripheral gangrene was reminiscent of the previous case, the diagnosis of an occlusive lesion of the mitral orifice was suggested.

Necropsy Findings. Heart: The parietal and visceral layers of the pericardium were smooth, glistening, and studded with many oval and flame-shaped hemorrhagic areas, a few of which showed pale centers. There were 100 cc. of straw-colored fluid in the pericardial sac. The right ventricle and atrium were moderately dilated. The muscle of the left ventricle was slightly thickened and streaked with yellow. The myocardium of both ventricles was brown and studded with miliary abscesses. The mural endocardium presented petechial hemorrhages similar to those on the pericardium. The mural endocardium below the aortic valve was slightly thickened, grey, and opaque. The tricuspid valve was thickened at the free margin, but the chordae tendineae were normal. The mitral valve was markedly thickened, and its free border rolled. Its chordae were greatly thickened and shortened, causing distortion of the valve. On the auricular surface of the anterior cusp of the mitral valve there was, as shown in the accompanying photograph, a loosely attached, irregularly oval, dull, red-purple mass 3 cm. long, 3 cm. wide, and 1 cm. in thickness, which protruded into the cavity of the left ventricle for a very short distance. This vegetation caused an almost complete occlusion of the orifice between the left auricle and ventricle. There was an irregularly oval perforation about

0.5 cm. in diameter in the posterior portion of the anterior cusp of the valve. The aortic valve was markedly thickened and opaque, and its free edge rolled, giving rise to incompetence as well as stenosis of the valve. The aortic commissures were obliterated by firm fibrous tissue. The coronary arteries in their proximal third showed slightly elevated intimal plaques, varying in size from 1 to 4 mm. There were no occlusions or ulcerations



FIG. 1. The heart in Case 2 showing the long vegetation on the mitral valve, which has become doubled upon itself in the process of fixation.

of the vessels, and the distal portions of the coronary arteries showed no abnormal changes. The aorta showed a moderate number of slightly elevated, yellow intimal plaques. There were no thrombi or emboli in the branches of the aorta and their major subdivisions.

The *lungs* were congested and edematous. There was passive congestion of the liver. The *spleen* was large and firm, and presented numerous wedge-

shaped infarcts. The splenic artery was partially occluded by a reddish purple mass about 8 cm. from its termination. The embolus was adherent to the wall of the artery, and extended into one of the small branches, which it obturated completely. The *kidneys* presented hemorrhagic areas on their surfaces and throughout the parenchyma and pelvis. There was a large infarct at the upper pole of the right kidney.

Gastro-intestinal Tract. There was an acute ulcerative enterocolitis. The terminal ileum and colon, especially the cecum and descending portion, presented numerous purple, elevated embolic abscesses, with necrotic yellow centers, some of which had partially sloughed.

COMMENT

In the first case, an instance of subacute bacterial endocarditis, the clinical course was slow enough to permit the appearance of the classical features of an occlusive thrombus of the mitral valve, as seen most commonly with "ball-valve" auricular thrombi. At first the occlusion was intermittent; there seemed to be some improvement in the circulation of the extremities for a short period after the peripheral cyanosis was first noted. The persistence of the systolic and diastolic murmurs at the apex on the first day spoke also for an incomplete occlusion of the mitral orifice. The rapid progression of the peripheral gangrene and the subsequent disappearance of the apical murmurs indicated that the obstruction to the mitral valve had become permanent and practically complete. Obstruction by a large ball-valve auricular thrombus may also be intermittent at first. This is well exemplified by the second of the three cases reported by Schwartz and Biloon, in which there were convulsions and disappearance of heart sounds during the period of occlusion of the mitral orifice, followed by the reappearance of the heart sounds and the restoration of the natural appearance of the extremities when the aperture was free. In this case the intermittent nature of the occlusion may have depended upon the mobility of a long, pedunculated vegetation which could be washed against, or into, the already narrowed opening by the blood stream in the left auricle. With the fragmentation of the thrombus into the blood stream, as evidenced by the numerous embolic phenomena and the embolization of a branch of the right renal artery, and the further growth of the vegetation by accretion, the mass on the mitral valve must have become broader and larger and caused a more complete and permanent obstruction of the aperture. This theory is borne out by the autopsy findings in the second case, an instance of acute bacterial endocarditis, which represents an earlier stage in the evolution of the mitral occlusion. Here we find a long vegetation actually protruding through the mitral orifice into the left ventricle.

The pre-existing mitral stenosis must be a factor in this type of occlusive lesion, as it is in cases associated with auricular thrombi. The rigidity of the valve leaflets and their relative immobility due to marked mitral sten-

osis may have been the predisposing factor in the formation of a large thrombus on the valve surface in the course of a bacterial endocarditis.

REFERENCES

Covey, G. W.; Crook, R.; and Rogers, F. H.: Ball Thrombus in Left Auricle. Am. J. M. Sc., 60: 175, 1928.

Hewitt, J. H.: Free Thrombi and Ball Thrombi in the Heart. Bull. Johns Hopkins Hosp., 17: 1, 1915.

Schwartz, S. P. and Biloon, S.: Clinical Signs of Occluding Thrombi of Left Auricle. Am. Heart J., 7: 84, 1931.

Ziemssen, V.: Zur Pathologie und Diagnose der Gestielten und Kugelthromben des Herzens. Congress f. inn. Med., 9: 281, 1890.

OVARIAN CARCINOMATA SIMULATING ACUTE SURGICAL CONDITIONS OF THE ABDOMEN[1]

PHINEAS BERNSTEIN, M.D.

Gynecological Service of Dr. Robert T. Frank

Ovarian carcinomata with the symptomatology of acute pelvic or abdominal conditions occur infrequently. Among sixty-four cases of malignant ovarian growths at The Mount Sinai Hospital there were four such cases. The diagnoses in these cases were respectively: acute suppurative appendicitis, pelvic abscess, intestinal obstruction due to rectal carcinoma and twisted ovarian cyst. Each patient presented a syndrome of pain, nausea, vomiting, chills, fever, abdominal rigidity, leukocytosis and rapid sedimentation time. The rarity of this atypical clinical onset and the high incidence of incorrect diagnosis in this type of case warrants the presentation of the following illustrative cases.

CASE REPORTS

Case 1. Ovarian carcinoma simulating acute suppurative appendicitis and later pelvic abscess.

(H. N. 329045.) A Russian born housewife, aged 61 years, was admitted to the hospital August 12, 1931. An ectopic gravidity had been removed 29 years ago; menopause at the age of 43. Sixteen months prior to this admission she entered another hospital for severe abdominal cramps, pain, vomiting, chills and fever. A right tubal abscess and a subacutely inflamed appendix were removed. For three months thereafter an abdominal sinus persisted. When the discharge from the sinus abated, the patient developed chills, fever, and mild abdominal cramps. Upon one of these occasions she was rehospitalized with a diagnosis of pelvic abscess, and a posterior colpotomy was performed. This drained continuously for the subsequent nine months.

She came to The Mount Sinai Hospital because of a sudden onset of abdominal pain, cramps, nausea, vomiting, chills, and fever. There was also marked urinary frequency.

Examination revealed a mass filling the entire pelvis, extending to the umbilical level on the left side and to the anterior superior spine on the right side. There was a profuse drainage from the colpotomy opening and a moderate cervical discharge. The liver was slightly enlarged, nodular, and hard. The sedimentation time was 8 minutes. The temperature

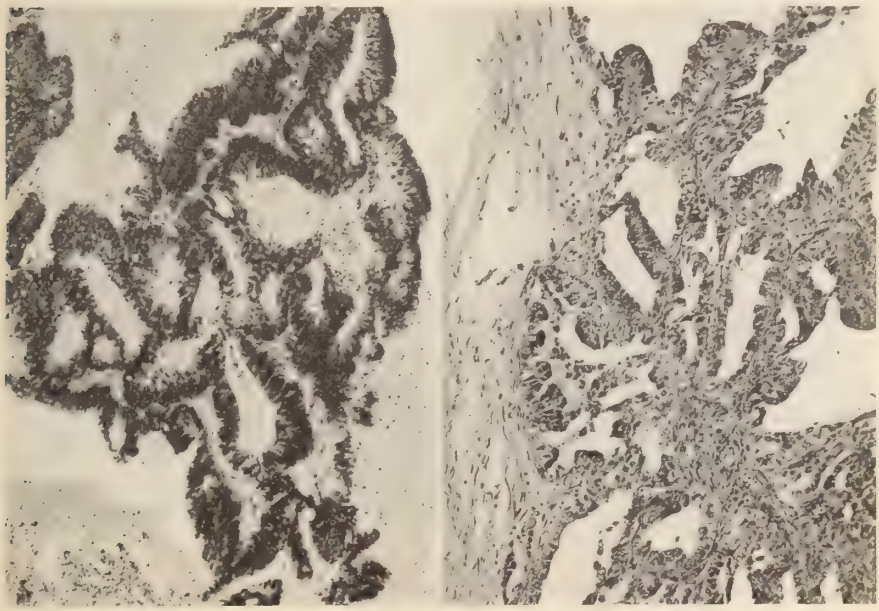
[1] Read before the Section of Gynecology and Obstretics at the New York Academy of Medicine, November 27, 1934.

varied between 101° and 104°F. The hemoglobin was 47 per cent, and there was a moderate leukocytosis.

Pus obtained from the opening in the posterior fornix was examined, and fragments of carcinomatous tissue (fig. 1A), hair particles, amorphous calcium elements, leukocytes and debris were identified microscopically. The development of an ovarian carcinoma in a dermoid cyst was diagnosed clinically and later confirmed by autopsy (fig. 1B).

Case 2. Ovarian carcinoma simulating pelvic abscess.

(H. N. 275008.) A white woman, aged 38 years, entered the hospital December 25, 1927, complaining of sharp, lower abdominal pain, radiating



A B

FIG. 1A. Fragments of carcinomatous tissue. Case 1
FIG. 1B. Section of carcinomatous tissue in dermoid cyst. Case 1

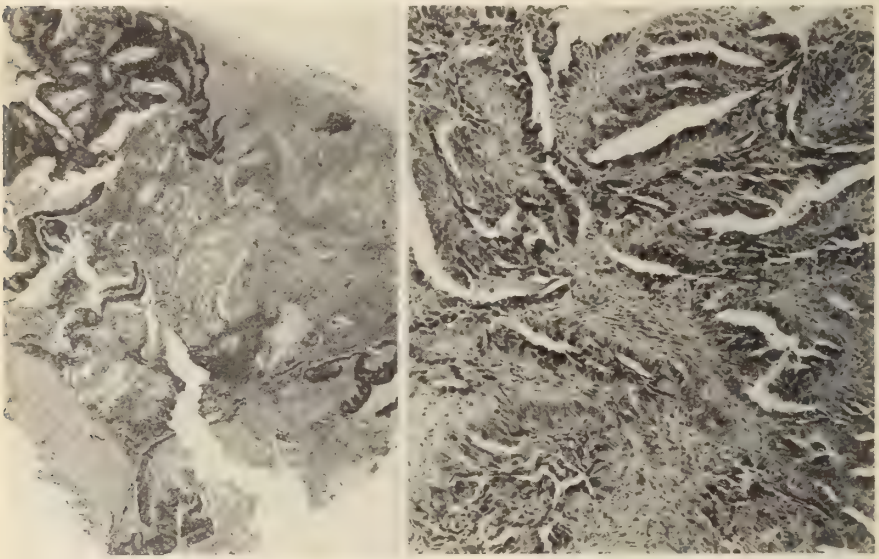
to the back and right buttock. The onset was sudden and was accompanied by vomiting, chills, and fever. She had a similar attack three months previously.

There was rebound tenderness and abdominal rigidity. Bimanual examination revealed a mass extending from one pelvic wall to the other. Areas of softening were palpable at several points behind the cervix. There was a profuse vaginal and a bloody purulent rectal discharge. Temperature ranged from 101° to 104.4°F., and sedimentation rates of 9 and 14 minutes were observed There was a moderate leukocytosis. The cervical smears

for gonococci and the Wassermann test were both negative. Upon this admission, as on the previous occasion, the diagnosis of pelvic abscess was made. A posterior colpotomy was performed, and pus was obtained.

Microscopic examination of the fluid obtained from the posterior colpotomy opening revealed carcinoma cells (fig. 2A). Subsequent exploratory laparotomy disclosed an inoperable carcinoma of the ovary with multiple adhesions to the intestines.

Had not an indication for colpotomy developed, it is unlikely that the correct diagnosis would have been made. In the two cases cited above the importance of microscopic examination of pelvic exudates is well illustrated.



A B

FIG. 2A. Carcinomatous fragments found in fluid obtained from posterior colpotomy opening. Case 2.

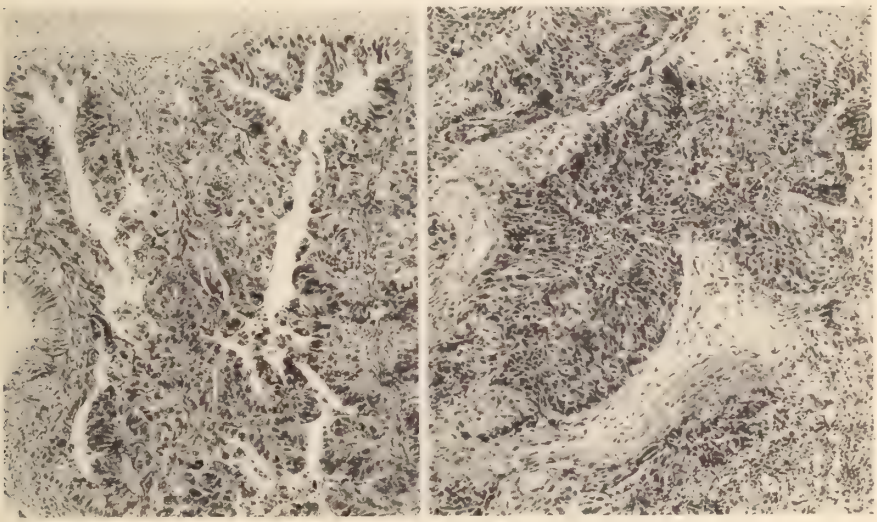
FIG. 2B. Section showing papillary adenocarcinoma, probably primary, in the rectum. Case 3.

Case 3. Ovarian carcinoma simulating acute intestinal obstruction. (H. N. 358292.) A 48 year old housewife was admitted to the hospital on December 12, 1932. She had an appendectomy at the age of 14 years, followed six months later by a laparotomy for adhesions. Since then the patient had been in good health. Suddenly on the day of admission the patient developed severe abdominal cramps, vomiting, distension, constipation, chills, and fever.

Examination revealed two lower abdominal scars. The right lower quadrant was spastic and tender. On vaginal palpation a pelvic mass was found filling the cul-de-sac and extending laterally almost to the pelvic walls.

A crater-shaped, friable, infiltrating mass, almost completely annular, was felt along the anterior wall of the rectum. Biopsy revealed papillary adenocarcinoma, considered to be primary, in the rectum (fig. 2B). At operation, however, an extensive bilateral ovarian carcinoma, densely adherent to the small bowel and invading the anterior rectal wall was found. The ovarian carcinomata were removed together with the adherent and invaded portions of the small bowel, and an ileosigmoidostomy and colostomy were performed.

The misleading nature of the symptoms in this case was probably due to the infiltrating character of the lesion.



A B

FIG. 3A. Section of adenocarcinoma of left ovary. Case 4.

FIG. 3B. Section of the biopsy material showing squamous cell carcinoma of the cervix. Case 4.

Case 4. Ovarian malignancy simulating ovarian cyst with twisted pedicle.

(H. N. 369799.) A 40 year old unmarried patient was admitted August 13, 1934 with the complaint of vaginal bleeding of three weeks duration. One year previously, the diagnosis of acute appendicitis and peritonitis had been made, and at operation in another institution a chronically inflamed appendix was removed. Three days after discharge she returned with symptoms of intestinal obstruction for which an ileostomy was performed. Three months later she was again admitted to the same hospital with signs of an acute surgical abdomen. The diagnosis of twisted ovarian cyst was made, and immediate operation was advised but refused by the patient. Two months later she entered The Mount Sinai Hospital, where

the diagnosis of twisted ovarian cyst again was made by the surgical staff. However, operation disclosed an adenocarcinoma of the left ovary with adhesions to the contiguous intestine (fig. 3A).

Radiotherapy given after operation resulted in amenorrhea, which in six months was interrupted by a period of constant and increasing spotting, for which she was re-admitted to the hospital. Examination at that time revealed a smooth, soft, friable, rounded mass arising from the cervix, hiding the latter from view. The bleeding was profuse. Biopsy proved the tumor to be a squamous cell carcinoma of the cervix (fig. 3B).

This case presents an uncommon coexistence of an adenocarcinoma of the ovary with a squamous cell carcinoma of the cervix.

COMMENT

The above reported cases illustrate that ovarian carcinomata may present at onset the full clinical picture of an acute surgical abdomen and that such symptoms are due to infection, adhesions and metastasis complicating the neoplastic lesion. A persistent discharge from a posterior colpotomy opening is highly suggestive of malignancy of the ovary and demands microscopic study of the exudate.

ACUTE ASEPTIC MENINGITIS

SOL W. GINSBURG, M.D.

[*Neurological Service of Dr. Israel Strauss*]

In 1925 Wallgren (1) described what he considered to be a new syndrome, to which he gave the name of Aseptic Meningitis. The patients were taken acutely ill with headache, vomiting and moderate fever. They all showed the usual clinical findings of meningitis, i.e., rigid neck, Kernig sign, depressed deep reflexes, etc. The cerebrospinal fluid was clear but contained between 150 and 750 cells, all monocytes. The total protein in the cerebrospinal fluid was slightly increased, while the sugar and chlorides were within normal limits. In all the cases tuberculous meningitis was the first diagnosis. All the patients have recovered in a period of from three to six weeks without residua or sequelae.

During the past eight years a number of reports of similar cases have been published, including several small epidemics (2). In 1930 Gunther (3) was able to collect over one hundred cases from the literature. Most of these cases occurred in the summer and autumn. The clinical descriptions were essentially identical with that given by Wallgren. However, a number of cases were reported in which the cerebrospinal fluid showed early in the disease as many as 45 per cent polymorphonuclear cells. The type cell, however, quickly changed to that of monocytes.

As yet no definite causative agent has been found in these cases. The probability of a virus infection was considered (4). Most observers, however, are not inclined to accept this condition as a disease entity, but rather as a clinical syndrome.

The first of the two cases here reported was observed recently at the hospital and served to recall a very puzzling case which had been observed in 1931 and which, in retrospect, undoubtedly belongs to this group. It was thought that while these cases are by no means rare, they are not generally recognized and are worthy of presentation.

CASE REPORTS

Case 1 (H. N. 368229). A 38 year old married woman was admitted to the Neurological Service on July 3, 1934. Her personal history was negative. She had been married for 15 years, had two children living and well, and had never had a miscarriage. For many years she had had occasional headaches, which had always been promptly relieved by tablets. For the last two years she had had "electric sensations" in the eyes, and the headaches had occasionally been preceded by sprays of lights. One

year before her admission to the hospital, the patient had had a supravaginal hysterectomy and bilateral salpingo-oophorectomy for menorrhagia and metrorrhagia.

Five days before her admission to the hospital the patient developed a headache somewhat different from her usual headaches, and complained of dizziness. She took to bed and for the next two days the headache gradually grew worse. Three days prior to admission the patient collapsed while on the way to the bathroom. She was unconscious for six minutes. Following her return to consciousness she consumed large quantities of water. The day before admission she had nausea and vomited a number of times. The vomiting was not projectile in type. On the day of admission the patient seemed confused and was somewhat delirious. She shrieked with pain.

On admission, the patient was found groaning in bed, holding her hand to her head. The temperature was 101.8, pulse 96, and respirations 22. The general systemic examination was negative. Blood pressure was 110/72. The only positive findings in the neurological status on admission were a questionable right facial weakness and a poor right plantar response. The blood count on admission showed 4,500,000 red cells, 8,300 white cells, 72 per cent polymorphonuclears. Urine examination was negative.

The findings in the cerebrospinal fluid are summarized in the following table:

	CELLS	MONOS	TOTAL PROTEIN	SUGAR	CHLORIDES
7/ 3/34 Slightly bloody (traumatic)	—	—	—	—	—
7/ 7/34 Clear	250	90%	105 mg.	0	760 mg.
7/13/34 Xanthochromic	308	100%	90 mg.	50	—
7/18/34 Clear (cisternal)	160	100%	54 mg.	0	690 mg.
7/25/34 Clear	65	100%	0	0	—
8/ 2/34 Clear	71	100%	0	0	—
8/17/34 Clear	27	100%	0	0	—
8/31/34 Clear	10	100%	65 mg.	0	715 mg.

The clinical course was characterized by a slow and gradual remission in the signs and gradual relief from the intense headaches. Re-examination on September 4, 1934 revealed the following positive findings: both pupils reacted poorly to light but promptly on accommodation; right pupil was greater than the left; there was a left Babinski sign and the right plantar response was neutral. The left abdominal reflexes were less active than the right. The patient was discharged from the hospital September 5, 1935, still complaining of slight headache. Her behavior during the latter part of her stay in the hospital was such as to warrant the feeling that a large psychogenic element was present in the production of these headaches.

Case 2 (H. N. 327132). A 33 year old woman was admitted to the Neurological Service on June 16, 1931. Her family, personal and past histories were entirely negative. Seventeen days before her admission to the hospital the patient had suddenly complained of severe headache and nausea and had begun to vomit. She lapsed into coma and was taken to another hospital, where four days later she was discharged with the diagnosis of psychoneurosis. The headaches persisted and ten days prior to admission her temperature began to fluctuate between 100° and 104°F. The day before her admission she was again semi-stuporous and somewhat incoherent. On admission to the hospital, examination revealed the following positive findings: rigid neck, bilateral Kernig sign and unequal pupils, left greater than right. A tentative diagnosis of tuberculous meningitis was made. The findings in the cerebrospinal fluid are summarized in the following table:

	CELLS	MONOS	TOTAL PROTEIN	SUGAR
6/16/31 Clear	660	98%	72 mg.	0
6/26/31 Clear	1,116	63%	—	0
7/ 1/31 Cloudy	14,300	75%	—	0
7/14/31 Clear	56	100%	67 mg.	0

During the first few days of her stay in the hospital, the patient was semi-stuporous, shrieked deliriously and seemed hopelessly ill. The ten days which were allowed to lapse between the first two punctures are to be explained by the fact that the patient's family objected to this procedure on religious grounds, and no great stress was brought to bear on them because of the presumed hopeless prognosis. The meningeal signs were increasing; the temperature rose to 104°F., and the patient was rapidly declining. However, July 1 the patient began to improve, and the meningeal signs began to diminish. Gradually the patient became alert and cooperative. Two and a half weeks later she was out of bed and walking. There were no residua of her meningeal process. She was discharged from the hospital on July 24, 1931. She was seen in the follow-up clinic on May 16, 1933 and was found entirely well and free of any objective neurological findings.

COMMENT

Two cases of acute aseptic meningitis are reported. The cases are exceptional in the fact that both patients had an episode of unconsciousness. In the first case the findings in the cerebrospinal fluid were uncertain because of the presence of traumatic blood. The lymphocytic pleocytosis on subsequent lumbar and cisternal punctures and the prompt recovery of the patient are characteristic of this condition. The second case, except

for the episode of unconsciousness, is typical of the syndrome of acute aseptic meningitis.

Aseptic meningitis must be differentiated from tuberculous meningitis. Normal sugar and chloride contents in the cerebrospinal fluid point to the former, but not always so. In our second case sugar was absent from the cerebrospinal fluid. The patient's unexpected recovery establishes the diagnosis.

REFERENCES

(1) Wallgren, A.: Une nouvelle maladie infectieuse du système nerveux central (Meningite aseptique aigue). Acta pédiat., 4: 158, 1925.

(2) Eckstein, A.: Epidemische Meningitis serosa. Klin. Wchnschr., 10: 22, 1931. Krabbe, K. H.: Beninge lymfocytaere Meningitis. Bibliot. f. Laeger, 121: 511, 1929.

(3) Gunther, A.: Uber akute "aseptisch" Meningitis. Jahrb. f. Kinderh., 128: 127, 1930.

(4) Veits, H. R. and Watts, J. W.: Acute Aseptic Meningitis. J. Nerv. & Ment. Dis., 80: 253, 1934.

OTITIC CAVERNOUS SINUS PHLEBITIS DUE TO THE BACILLUS FRIEDLANDER

BENJAMIN ALLEN, M.D.

[*Service of Dr. I. Friesner*]

Cavernous sinus phlebitis of otitic origin is not a rarity. Yet, it has occurred infrequently enough to warrant reporting cases which have more adequate laboratory and pathological studies along with the clinical findings. The case herein recorded is of further interest in that it presents the very unusual finding of the Bacillus Friedlander as the invading organism of this general sepsis. This organism was found in the pus from the middle ear, in the blood, urine, and the cerebrospinal fluid.

CASE REPORT

History (H. N. 362283). The patient was a fifty-two year old housewife whose past history presented no significant data other than the existence of chronic maxillary sinusitis. Her recent illness began six weeks prior to admission to the hospital with pain in the left ear. Myringotomy was performed ten days later. Pus was obtained but was not cultured. The otalgia, which until then had been persistent, ceased but recurred four days later. The middle ear discharged moderately. One week after the myringotomy, a simple mastoidectomy was performed. The patient was discharged seven days later and remained comfortable during the next few days. But on the tenth day following the mastoidectomy, there developed severe frontal and vertical headache. On the sixteenth day, redness and swelling about the left eye with some proptosis appeared. That night the temperature was elevated (101°F.) for the first time. On the eighteenth day, the right eye also became involved by redness, swelling, and proptosis with concomitant temperature rise to 104°F. and a slight shaking chill. There was also some nuchal and suboccipital pain. She then entered The Mount Sinai Hospital.

Examination. The patient was very drowsy, but could be aroused and made to respond to questioning. The systemic examination was negative. No neurological findings were present, except for some slight resistance on flexing the head. There was very marked chemosis of the conjunctiva of both eyes, left greater than right. Both globes were markedly proptosed. There was a bilateral tense edema of the lids with extension on to the glabella, forehead, and temples. The right pupil reacted well to light. The left reacted but sluggishly. The fundi showed practically no changes, except for very slight dilatation of the veins. The nerve heads were not

blurred. The right was normal. The left ear drum was red and full with a few radiating vessels present. No landmarks were evident. There was a profuse, purulent, pulsating discharge from a postero-central perforation, but no canal wall change. The hearing could not be tested. A post-auricular mastoidectomy scar was present, healed except at the lower angle from which appeared a profuse discharge. The nose and throat examination revealed some crusting present on both middle turbinates with some mucopus in the right and left middle meatus posteriorly. Both sphenoids were probed, but showed no evidence of pus. Nasopharynx and pharynx were negative. Her temperature was 101.4°F.

Laboratory Data. Blood: Hemoglobin, 78 per cent (Sahli); white blood corpuscles, 12,000; polymorphonuclear neutrophiles, 84 per cent; lymphocytes, 14 per cent; monocytes, 2 per cent. Urine was negative except for occasional hyaline casts. Cerebrospinal fluid, taken on the fifth day after admission, was turbid, contained 10,200 white blood cells per cubic millimeter with 86 per cent polymorphonuclear neutrophiles and 14 per cent lymphocytes, and showed bacilli (B. Friedlander) on smear.

Bacteriological Reports: Cultures of pus from the middle ear (taken on the day of admission) revealed B. Friedlander. Blood (taken on the day following admission) showed B. Friedlander (1–2 colonies per cubic centimeter). Urine and cerebrospinal fluid (taken on the fifth day after admission) revealed B. Friedlander.

Course. Meningeal signs were already present on the first day of admission to the hospital. They became outspoken on the fourth day. During the first day in the hospital, there was an increase in proptosis, more marked on the right. On the third day, there had occurred definite progression in the chemosis of both upper eyelids with retrogression in the lower lids. On the fourth day, however, there was also improvement in the chemosis, redness, and swelling of the upper eyelids, with decrease in proptosis of both eyeballs. During the next two days, there was further marked retrogression of chemosis, swelling of all eyelids, and proptosis so that at the time of death, on the seventh day after admission to the hospital, these signs were hardly apparent.

Necropsy Findings. Upper Respiratory Passages: There were present an acute mucopurulent nasopharyngitis, an acute catarrhal ethmoiditis and sphenoiditis, and an acute catarrhal bronchitis.

Brain: A thick inflammatory exudate was present on the meninges made up of dense accumulations of polymorphonuclear and large mononuclear cells. The cortex immediately underlying was edematous. There was a similar thin layer on the ependymal lining of the ventricle.

Temporal Bone: Suppuration was present in the middle ear and mastoid (postoperative) cavity. The infectious process had extended into the petrous pyramid involving the paralabyrinthine cells which were unusually large, particularly those around the region of the internal auditory meatus.

The apex of the petrous pyramid which was of mixed type, partially pneumatic and partially diploetic, was involved. There was a considerable amount of bone necrosis with sequestration. In a few areas the infectious process had involved the bony cortex of the middle and posterior fossa and had produced extradural abscesses. The dura was markedly thickened and partially lifted away from the cortex. Also the infectious process involved the carotid canal with some phlebitis of the veins about the carotid artery. There was a marked amount of purulent exudate about the eighth nerve and also along the facial canal up to the geniculate ganglion.

Venous Sinuses: Grossly, there was no thrombus in any of the venous sinuses. The walls of the lateral sinus and of the superior and inferior petrosal were grossly smooth and normal. The cavernous sinuses contained no thrombus, but appeared somewhat thickened. Microscopically, there was an acute inflammation of both cavernous sinuses.

DISCUSSION

Cavernous sinus inflammation of otitic origin is not rare. Dwight and Germain in 1902 reviewed the literature on cavernous sinus thrombosis up to that time. Of one hundred and forty-nine reported autopsies, forty-three of these cases of cavernous sinus inflammation originated from the ear. In 1909, Jackson reviewed twenty-five cases of cavernous sinus thrombosis published since the paper of Dwight and Germain. Thirteen of these twenty-five cases originated in the middle ear and mastoid. Eagleton in 1926 reported fifteen complete autopsies on cases of cavernous sinus thrombosis. Six of these cases originated in aural suppuration. Friesner in 1914 reported a case of a bilateral cavernous sinus thrombosis with both sinuses becoming simultaneously involved twelve hours after a simple mastoidectomy. Maybaum in 1918 witnessed this condition complicating an obturating thrombus in sigmoid sinus and bulb.

The pathways of extension from the ear and mastoid, according to Eagleton, may be divided into two groups: a posterior and an anterior. In the posterior group are included extension along the inferior petrosal from the jugular bulb and, much less frequently, along the superior petrosal from the knee of the lateral sinus. Also there may be involvement of the cavernous sinus by disease at the apex of the petrous pyramid. The anterior route of involvement from the ear is by means of the carotid venous plexus, as the latter passes through its canal in the petrous pyramid. This plexus communicates with the anterior part of the cavernous sinus. Posteriorly, it communicates with the jugular vein, the middle ear by means of the carotid-tympanic vessels, and also receives vessels from the bone.

Eagleton states that in involvement of the cavernous sinus by this posterior route the classic signs of chemosis and exophthalmos appear late or are not present at all. This is because the disease in the cavernous sinus is at first limited to the posterior position and does not interfere with

the return flow of the ophthalmic veins and permits the formation of a collateral circulation during the forward extension of the disease. In involvement of the cavernous sinus by the anterior (carotid venous plexus) route, chemosis and exophthalmos occur early but are transient in nature, since the infection by this route (in the opinion of Eagleton) enters the "venous lake" at the anterior extremity of the cavernous sinus made up of the ophthalmic veins, the veins from the nasopharynx and pterygo-maxillary fossa, and the carotid plexus. It thus causes partial occlusion at the anterior end with the consequent disturbance in the return of the ophthalmic circulation. Chemosis and exophthalmos thus occur, but subside with the reestablishment of the venous return. However, chemosis and exophthalmos may recur from a forward extension of the thrombus into the ophthalmic veins.

In the case here reported no thrombus was found at post mortem in either cavernous sinus. Yet the patient presented the classic symptoms of chemosis and exophthalmos, though transient in nature. The cavernous sinus walls, however, were definitely diseased and so were the veins of the carotid venous plexus. It is possible that the infection travelled by means of the latter from the diseased temporal bone to the cavernous sinus. There a circulatory disturbance was probably caused by the phlebitis resulting in the typical eye findings, though temporary in nature. Not without importance is the rôle of the sphenoidal sinus suppuration in this case. It can not be ruled out entirely as a primary cause of the cavernous sinus phlebitis. However, the clinical course of the case which began with an otitis media and was followed by mastoiditis, the finding of the Bacillus Friedlander in the pus from the mastoid as well as in the general circulation, and finally the post mortem findings of extension of disease from the ear through the petrous pyramid with perforation near the apex and involvement of the carotid venous plexus by disease lead one to accept the diagnosis of cavernous sinus phlebitis of otitic origin as the more tenable. Eagleton, who has reported several similar cases, observes that in these cases of cavernous sinus phlebitis, apparently of aural origin, there is often associated a sphenoidal sinus suppuration, and that the cavernous sinus phlebitis may have aroused in these cases a dormant sphenoidal sinus infection.

The Bacillus Friedlander is but infrequently found in middle ear disease, though it is a rather frequent inhabitant of the upper respiratory tract. It is often found in the chronic atrophic form of nasal disease. In the normal pharynx it was found in ten to twenty per cent of the cases examined by V. Lingelshein and by Furst (Ford). Netter found it in the buccal cavities of 4.5 per cent of normal individuals examined by him (Ford). Hasslauer found it thirteen times in one hundred and eleven nasal cavities (Ford). It is infrequently found in middle ear suppuration. I have come across no reports of its being found in the cranial venous sinuses prior to this case.

REFERENCES

Dwight and Germain: Thrombosis of Cavernous Sinus with Report of Four Cases. Boston M. & S. J., 146: 456, 1902.

Eagleton, W. P.: The Carotid Venous Plexus as the Path of Infection in Thrombophlebitis of the Cavernous Sinus. Arch. Surg., 15: 275, 1927.

Cavernous Sinus Thrombophlebitis. New York, Macmillan Co., 1926.

Ford, W.: Text-book of Bacteriology. Philadelphia, W. B. Saunders Co., 1927, p. 562.

Friesner, I.: Case of Simultaneous Bilateral Cavernous Sinus Thrombosis Twelve hours after a Simple Mastoid Operation. Ann. Otol., Rhinol. & Laryngol., 23: 410, 1914.

Jackson, E.: Ocular and Orbital Symptoms of Thrombosis of the Cavernous Sinus. Ophthalmology, 5: 185, 1909.

Maybaum, J. L.: Cavernous Sinus Thrombosis of Otitic Origin. Ann. Otol., Rhinol. & Laryngol., 30: 1061, 1921.

Smith, D.: Cavernous Sinus Thrombosis with Notes of Five Cases. Arch. Ophth., 47: 482, 1918.

MEDIASTINOTOMY FOR ACUTE SUPPURATIVE MEDIASTINITIS[1]

MAURICE M. BERCK, M.D.

Acute suppurative mediastinitis can be due to extension of infection from structures in or adjacent to the mediastinum; it may be metastatic or may be the result of trauma with secondary infection. There is a general impression that the lesion is usually a diffuse phlegmonous infection which spreads rapidly, runs a virulent course and terminates fatally. Nevertheless, not a few of the cases encountered at The Mount Sinai Hospital have been found to be circumscribed areas of suppuration, usually in the posterior mediastinum, and amenable to surgical evacuation.

The following case of streptococcic abscess in the posterior mediastinum illustrates a type of mediastinal suppuration apparently derived from a pharyngeal infection. Pulmonary manifestations were in the clinical foreground. The mediastinal abscess was not suspected nor diagnosed until a roentgen-ray examination was made. Adequate surgical intervention resulted in cure.

CASE REPORT

History and Course (H. N. 366006). A male, 20 years old, was admitted on May 9, 1934 to the private pavilion of The Mount Sinai Hospital in a profoundly prostrated condition. His past history was negative. There was a sudden onset of pain in the throat and fever three weeks before admission. Pain on swallowing was noted, and this symptom was more or less continuous throughout the illness. In the first week fever ranged up to 104.5°F.; the patient was prostrated, and there was rapid emaciation. The state of severe illness continued into the second week although fever was at a somewhat lower level. Fever returned to a high level in the third week. Soon after the onset, the throat was examined and a reddened, granular, edematous pharyngeal mucosa was noted. Tenderness of the cervical musculature was noted, but there was no external swelling or regional lymph node involvement. Toward the end of the first week the physical signs of a bronchopneumonia of the right lower lobe were found. In the second week these signs cleared up with coincident improvement in the condition of the patient. However, at the beginning of the third week pain in the right shoulder appeared and the physical signs of a pulmonary process in the right upper lobe developed. During the three

[1] Case treated by Dr. Harry Wessler and Dr. Harold Neuhof at the Private Pavilion of The Mount Sinai Hospital.

weeks' illness there was expectoration of moderate amounts of mucopurulent sputum, which in the later stages became occasionally streaked with blood.

Although the diagnosis of some form of upper respiratory infection with secondary bronchopneumonia seemed clear in the first week, the persistent pain in the cervical musculature and the rapid emaciation were



Fig. 1. Pre-operative roentgenogram showing the spherical expansion of upper mediastinum. The abscess presents on the right side of the upper posterior mediastinum, as was shown at operation.

atypical features. The new physical signs in the third week with persistent fever, further emaciation, and drenching sweats led to a suspicion of a tuberculous pneumonia. A roentgen film was then taken and revealed a large hemispherical shadow in the right upper chest adjacent to the mediastinum, extending slightly to the left of the median line (see accompanying figure). This shadow of homogeneous density presented a smooth, round, sharply defined peripheral border. The roentgen appearance was, however, characteristic of a mediastinal abscess only in view of

the clinical picture. From the film itself a diagnosis of a mediastinal cyst or tumor might be made. Although the remains of a pneumonic infiltration in the right upper lobe were discernible in the film, the important facts were that there was no evidence of pulmonary tuberculosis and that the large shadow in no way suggested the pleural complication of a pneumonia.

Patient's Condition on Admission to the Hospital. The patient was extremely emaciated, toxic, febrile, pale, and prostrated. He was perspiring profusely. The pharynx was still reddened, the mucosa having a granular appearance. On the right lateral aspect of the pharynx there was on palpation a sense of elasticity without infiltration. Tenderness without infiltration was noted along the mesial border of the right sternomastoid muscle. On examination of the chest there were the physical signs suggestive of a pneumonic infiltration in the right upper lobe, particularly posteriorly. There was severe tenderness on percussion in the right upper interscapular region over the site of the mediastinal shadow, as seen by X-ray.

Operation. Operation was performed shortly after admission under avertin anesthesia (Dr. Harold Neuhof). The first paravertebral aspirations in the third and fourth right intercostal spaces were negative. Additional aspirations in the second and third interspaces somewhat away from the vertebral column revealed thick odorless pus. However, pus was encountered only when the needles were inserted to a depth of about 12 to 14 cm. The needles were left in place as guides and the third rib between them was exposed through an incision across the erector spinae muscle mass. A rib section was subperiosteally excised. A small inadvertent pleural entry was noted, and the pleural cavity was found to be free from infection. Contiguous adherent lung was noted, and the pneumothorax which was induced was, therefore, not extensive. The aspiration needles were found to have entered the mediastinum mesial to the site of adherent lung. The bridge of fibrous tissue between them was split across. The needles were followed by grooved directors and dressing forceps and a large non-odorous collection of pus was entered. (Report of bacteriologist: Streptococcus Hemolyticus.) After the collection of pus was evacuated by suction, deep retractors were inserted and the cavity inspected. An additional pus pocket, situated directly in front of the bodies of the second and third thoracic vertebrae, was entered and evacuated. The site of pleural penetration which had been carefully packed off was now retracted together with the adjacent pleura in order to completely inspect the interior of the abscess cavity. It was found to be lacking in any confining or limiting inflammatory membrane. Its walls were soft and moved back and forth with respiration. The lateral limits of the cavity were the parietal pleural reflections. The posterior and superior limits were the vertebral column and the arch of the aorta. Both structures were laid bare and were readily visualized. The full depth of

the cavity could not be ascertained because of the tendency of the walls to fall together. In fact, the space as a whole speedily contracted as the pus was evacuated. Under visualization the cavity was widely packed to its depths, tubes only being employed to maintain the external orifice.

Comment on the Operative Treatment and Pathology. There was no parietal representation or attachment of the abscess such as one sees in empyema or encounters in some of the cases of mediastinal abscess. Accordingly, a wider approach which might have offered a better visualization of the lesion would probably have resulted in a larger pleural entry and would certainly not have improved the drainage. The operative approach to the lesion can be properly described as the "neck of a bottle". Penetration of the pleura in the approach to the lesion appeared inevitable because the pleura could not be stripped away for the completely extrapleural entry into the mediastinum. The absence of any exudate, fibrin masses or broken down lymph nodes is noteworthy. Attention should be called anew to the absence of any inflammatory reaction of the adjacent tissues. Therefore, the impression was gained at the end of the operation that although evacuation of the collections of pus appeared adequate, residual pocketing might take place. There was one other case in the series of mediastinal abscesses seen at The Mount Sinai Hospital in which the absence of any limiting membrane was a striking feature.

Postoperative Course. The immediate postoperative course was not satisfactory, fever ranging as high as 103°F. in the first week. A hydropneumothorax in the right pleural cavity was noted in the postoperative roentgenogram. This presumably was not grossly infected inasmuch as it absorbed spontaneously. Eight days after operation the packings were removed. The mediastinal abscess cavity was found to be a long narrow clean space extending anteriorly to so great a depth that a large sized Cameron Light did not reach to the bottom. Applicators placed into the cavity pulsated violently with the aortic impulse and also registered respiratory motion. In the midst of the region of adherent lung and pleura there was a blow as of a bronchial fistula, but the site could not be visualized. The cavity, although clean, was lightly repacked in view of the above mentioned possibility of a residual pocket.

After the first week fever subsided, and the patient's general condition began to improve rapidly. Packings were again changed at the end of the second week. This time the cavity was a long but very narrow tract which was quite clean. A blow suggesting a bronchial fistula still persisted. Pulsation of the aorta was still readily discernible, but the bodies of the vertebra were covered over by granulations. The cavity was then lightly repacked. The patient was discharged four weeks after operation with the wound almost healed. The healing was completed shortly after discharge from the hospital. A roentgenogram at this time showed the absence of any abnormality in the chest, and the patient was free of general and local symptoms two months after operation.

DIABETES INSIPIDUS AND HYSTERICAL POLYURIA

Their Differentiation

SOLON S. BERNSTEIN, M.D.

[*Service of Dr. B. S. Oppenheimer*]

The classic picture of diabetes insipidus is such that the identification of the disease presents little diagnostic difficulty. The excretion of huge quantities of urine of extremely low specific gravity accompanied by intense thirst is quite typical. Fluid restrictions are occasionally productive of dramatic episodes by inducing maniacal and suicidal trends, and instances are recorded of sufferers who drank their own urine. Even where there is no restriction to the slaking of thirst the persistent polyuria produces marked nervousness, restlessness, insomnia and irritability. Relatively little attention, however, has been paid to the not inconsiderable proportion of mild, atypical and capricious forms of the disease. These are characterized by slight or moderate increase in thirst and diuresis, alternating at times with periods of normal or even decreased secretion. As emotional instability also frequently accompanies the less severe forms, it is occasionally difficult to distinguish between hysterical (functional) polydipsia or polyuria and true diabetes insipidus.

CASE REPORT

History (H. N. 372279). An Austrian born woman of 45 complained of marked thirst, urinary frequency and increasing nervousness for the last six months. Although her health had always been uniformly good, she had been the victim of profound social, economic and sexual maladjustments, and recited her long series of misfortunes with histrionic fervor. She was divorced five years ago after eighteen years of an unhappy marriage, which was punctuated by constant bickering, extreme privation, and the birth of a feeble-minded son. Since early childhood she has responded to intolerable situations with hysterical seizures and periods of mental depression. Regularly thwarted and disappointed, she turned to sexual promiscuity, but found little relief. Almost complete frigidity appeared with the advent of the menopause a year ago. The psychogenic coloration of her complaints became evident when she described a trauma to her head without definite sequelae which she sustained twelve years ago. She magnified and dramatized subsequent irrelevant symptoms. Following a robbery four years ago, she has been disturbed by frequent nightmares, nocturnal screams and persistent ill-defined fears. Unemployed

for a year, her small reserve became rapidly exhausted, and for the last six months she has been put on relief. During this period her nervous instability became intensified, and she observed increasing thirst and urinary frequency. Although the thirst has been variable in its intensity, it has persisted until the present. For the last month she has also experienced a severe substernal burning sensation accompanied by extreme tenderness of the skin of the anterior chest; this was always promptly relieved by drinking cold water. Although her appetite has been very poor since the onset of the polydipsia, the loss in weight has been slight. Headaches have been absent. For the last two weeks she has noted a burning sensation in the vulva.

Examination. The patient was highly excitable, apprehensive, and verbose, and complained constantly that she was "burning up". Her color and state of nutrition were good. Except for distinct tenderness over the manubrium sterni and moderate hyperalgesia of the surrounding skin, no abnormalities could be determined. There was no skull tenderness. The pulmonary and cardiovascular systems were normal in every detail. Skull roentgenograms revealed a normal sella, with no evidence of increased intracranial pressure. The visual fields were not contracted, and the disc margins were sharply defined. A complete neurological survey was negative, except for marked exaggeration of the deep tendon reflexes. The psychiatrist, who saw her shortly after admission, interpreted the clinical picture as a conversion hysteria, the polyuria representing the return of the vanished libido at an inferior level. This belief was shared by most of the staff. The daily urinary secretion without medication averaged five liters and the specific gravity 1.006. Microscopic urinary studies were negative. A 24 hour specimen contained 120 mg. of urea nitrogen and 82 mg. of chlorides. The chlorides which rose as high as 120 mg. varied with the salt intake. Further laboratory studies revealed hemoglobin, 75 per cent; red blood cells, 4,460,000; white blood cells, 11,500; polymorphonuclears, 68 per cent; lymphocytes, 24 per cent; monocytes, 6 per cent; basophiles 2 per cent. The blood Wassermann test was negative. Blood chemistry: blood cholesterol, 500 mg.; urea nitrogen, 9 mg.; glucose, 90 mg.; chlorides, 560 mg.; calcium, 10.4 mg.; phosphorous, 3.5 mg.

The Janney test showed a normal glucose tolerance. The basal metabolic rate was minus 10 per cent. An electrocardiogram revealed no abnormality.

Course. With all medication withheld for four days, the diuresis varied from four to six liters per diem. In view of her suggestibility and hysterical features, a hypodermic injection of normal saline was administered on the fifth day. She enthusiastically greeted this therapeutic attempt, terminating what she considered a long period of neglect. For the next twenty-four hours, the urinary output fell to 2800 c.c., and she stated that there

was distinct lessening of the sensation of "burning" and the sternal tenderness. At this point, however, it was discovered that she failed to record accurately her total fluid exchange. More rigid control revealed a less striking reduction in diuresis following the hypodermic injection of normal saline solution, although the associated symptoms were reduced in intensity.

Repeated attempts to perform a water deprivation test failed because of surreptitious drinking. Following supervised complete abstention from liquid for fourteen hours, accurate determinations were finally secured. The urinary specific gravity during this period varied thus: 1.006; 1.004; 1.008; 1.004; 1.006. This failure to concentrate was almost presumptive evidence of the presence of diabetes insipidus.

On the tenth day the injection of 1 c.c. of Pitamin (posterior pituitary extract) was promptly followed by the disappearance of all symptoms, a sense of exhilaration, and a fall in diuresis to 1200 c.c. Substitution of sterile hypodermics was readily recognized by the patient, and they became totally ineffective. Continued daily intranasal administration of posterior pituitary extract prevented any return of symptoms.

In the light of experimental studies suggesting that amidopyrine has an antidiuretic influence through its effect on the "water center" in the midbrain, it was administered in five grain doses three times daily. Although rise in diuresis was slight after pituitrin was stopped, the period of observation was limited to three days, and the results can not be interpreted as significant.

DISCUSSION

The known antidiuretic effect of posterior pituitary extract limits its value as a diagnostic test for diabetes insipidus. The prompt reduction in diuresis following its use is most striking after forced fluid ingestion. There are doubtless many instances of pathologic drinking and hysterical polydipsia that have been incorrectly classed as diabetes insipidus because this fundamental physiologic property has been ignored. It is now generally conceded that the inhibition in diuresis is largely due to the specific hormonal influence of the posterior lobe of the hypophysis on the renal epithelium whereby the tubular cells are stimulated to increased fluid resorption. Although extrarenal factors no doubt exist, their rôle has thus far not been clearly evaluated.

COMMENT

A case is presented which was originally interpreted as a hysterical polyuria or polydipsia because of profoundly psychogenic features. The diagnosis of diabetes insipidus was confirmed by the failure of urinary concentration during a period of complete water deprivation. As posterior pituitary extract is pharmacologically antidiuretic in instances of forced

fluid intake, this test is of crucial importance in distinguishing mild and atypical forms of the disease. The negative roentgenologic, neurologic and ophthalmologic studies do not exclude the presence of organic pituitary or hypothalamic disease, as such lesions are generally minute and slow growing.

REFERENCES

Burgess, W. W.; Harvey, A. M.; and Marshall, E. K., Jr.: The Site of the Antidiuretic Action of Pituitary Extract. J. Pharmacol. & Exper. Therap., 49: 237, 1933.

Gersh, I.: Reabsorption of Water during Pituitary Antiduresis. J. Pharmacol. & Exper. Therap., 52: 231, 1934.

Kahn, B. S.: The Use of Amidopyrine in a Case of Diabetes Insipidus. J. A. M. A., 100: 1593, 1933.

Molitor, H. and Pick, E. P.: Zur Kenntnis der Pituitrin Wirkung auf die Diurese. Arch. f. Exp. Path. u. Pharmakol., 101: 170, 1926.

Pick, E. P.: The Regulation of Water Metabolism. Harvey Lect. 1929–1930. Baltimore, Williams & Wilkins, 1931. Vol. 25, p. 25.

ACUTE CORONARY ARTERY OCCLUSION WITH PERFORATION OF THE INTERVENTRICULAR SEPTUM

A Clinical and Electrocardiographic Study

A. M. MASTER, M.D., and H. L. JAFFE, M.D.

[*From the Cardiovascular Laboratory and the Medical Service of Dr. George Baehr*]

Perforation of the interventricular septum following infarction due to coronary artery occlusion can now be suspected clinically whereas it has hitherto been a post mortem diagnosis. Sager (1) has reviewed the literature thoroughly and has suggested that the development of a marked precordial systolic thrill and a loud harsh systolic murmur in a patient who has developed a coronary artery occlusion indicates a perforation of an infarcted septum. Sager made such a diagnosis antemortem. We wish to present a case in which the diagnosis of acute coronary artery thrombosis with myomalacia of the posterior wall of the left ventricle, of involvement of the posterior portion of the septum with perforation of the septum was made clinically and later confirmed by post mortem examination.

CASE REPORT

History (H. N. 366717). A woman of 65 years was admitted to the hospital on May 28, 1934. She had had arterial hypertension for at least four years; the systolic blood pressure had been 190; the diastolic was unknown. There had been dyspnea on exertion. Beyond these few facts her past history was not significant. Ten days prior to admission to the hospital the patient was suddenly awakened from sleep experiencing a sensation of nausea. She vomited. She was considered to have some gastro-intestinal disturbance, but when, on the third day of her illness, she tried to get out of bed, she collapsed. Dyspnea was marked; her lips were cyanotic; pallor and perspiration were extreme. The blood pressure was found to be low, and there was observed a loud murmur. Digitalis was given daily. On the day before admission her condition became worse; nausea became aggravated; both lung bases were slightly dull with diminished breath sounds and voice; moist râles were heard there. The liver, however, was not enlarged, and there was no evidence of peripheral edema. The venous pressure was somewhat elevated (15 cm.). The "ether circulation time" was normal ($6\frac{1}{2}$ seconds). It was determined by a method (2) recently described, and measures the interval of time between the injection of ether into an antecubital vein and the appearance of ether in the breath, i.e., to the lung capillaries. The retinal arteries were narrow and compressed the

veins. The rectal temperature was 100°F. The white blood cell count was 22,500 with 93 per cent polymorphonuclear cells.

An electrocardiogram taken May 29, 1934, the day on which the patient died, revealed a normal sinus rhythm, with a rate of 80 to 90 beats per minute (see accompanying figure). The P-R interval, that is, the auriculoventricular conduction time, was 0.16 second, which is well within the normal limit. The P-wave (auricular wave) was diphasic. A left ventricular

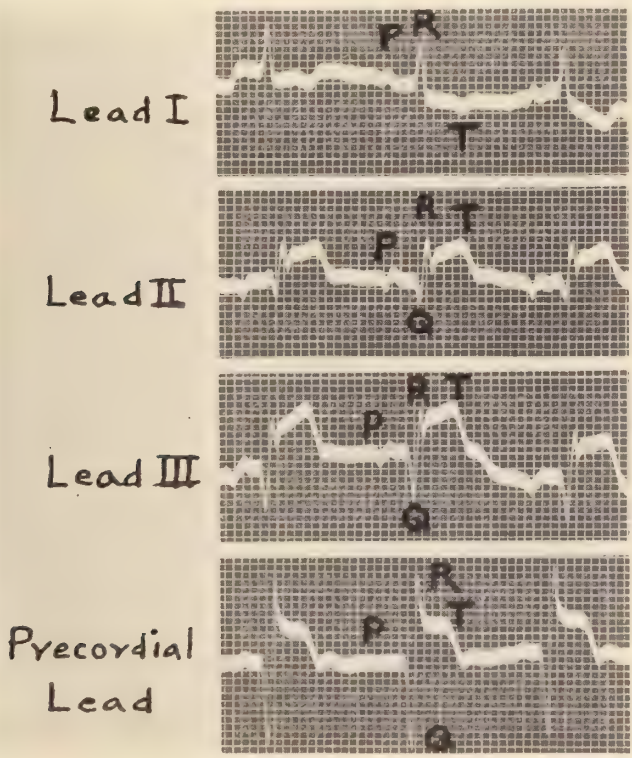


FIG. 1. Electrocardiogram characteristic of acute coronary artery occlusion involving posterior wall of left ventricle and posterior portion of interventricular septum.

preponderance was present. The T-wave was inverted in lead I, but this abnormality was overshadowed by the unusually marked monophasic RS-T-wave in leads II and III, and in the precordial or "fourth" lead. These RS-T changes (3) are characteristic of acute coronary artery occlusion and enlargement of the Q-wave (4) in leads II and III is associated with lesions involving the posterior portion of the interventricular septum. Moreover, the RS-T transition deviations occurring in these two leads suggested involvement of the posterior wall (5) of the left ventricle, that

portion of the heart usually supplied by the right coronary artery. Because of this characteristic electrocardiogram the location of the infarct was considered to be the posterior wall of the left ventricle and the posterior inferior portion of the interventricular septum.

The patient died a day after admission.

Post Mortem Findings. Acute thrombosis of the posterior descending branch of the right coronary artery with myomalacia and pin point perforation of the posterior portion of the interventricular septum at the apex was found. There was a bulge of the septum into the right ventricle. There was also an area of myomalacia with aneurysmal dilatation at the apical portion of the posterior wall of the left ventricle; the left anterior descending and circumflex arteries were narrow; the right heart was dilated, the entire heart hypertrophied, and general arteriosclerosis was marked. The lungs and liver were congested.

COMMENT

The arteriosclerotic involvement of the left coronary artery in addition to the thrombosis in the posterior descending branch of the right coronary confirmed the conclusion of Sager (1) that septal perforation occurs only if both arteries are involved. In other words, the septum received a poor blood supply from both coronary vessels, and this explained the development of a perforation following an occlusion of one of the arteries. Furthermore, this marked arterial narrowing probably explains why the condition proved fatal. The pin point perforation causes a loud murmur and a marked thrill but it is doubtful whether it plays an important rôle in itself. The ether circulation time was normal, and it is probable that had there been much blood shunted from the left ventricle to the right, this figure would have been much higher and the venous blood pressure would have been increased even more than it was.

SUMMARY

Acute coronary artery occlusion with septal perforation, involvement of the posterior wall of the left ventricle and involvement of the posterior portion of the septum was diagnosed clinically and confirmed by autopsy.

The development of a loud, harsh, rough systolic murmur and marked thrill over the midsternum and over the precordium in a patient who has developed an acute coronary artery occlusion suggests rupture of the interventricular septum.

It has been confirmed that an electrocardiogram depicting RS-T transitions in leads II and III indicates involvement of the posterior wall of the left ventricle, a portion of the heart usually supplied by the right coronary artery.

Similarly, an electrocardiogram in which Q2 and Q3 are large is characteristic of involvement of the posterior portion of the septum.

Perforation of the interventricular septum occurs when the blood supply of the septum is particularly deficient, that is, when both coronary arteries are involved. This is probably the reason this lesion is fatal.

REFERENCES

(1) Sager, R. V.: Coronary Thrombosis. Perforation of the Infarcted Interventricular Septum. Arch. Int. Med., 53: 140, 1934.

(2) Hitzig, W. M.: Measurement of Circulation Time from Antecubital Veins to Pulmonary Capillaries. Proc. Soc. Exper. Biol. & Med., 31: 935, 1934.

(3) Eppinger, H. and Rothberger, C. J.: Zur Analyse des Elektrokardiogramms. Wien. klin. Wchnschr., 22: 1091, 1909.

Samojloff, A.: Weitere Beiträge zur Elektrophysiologie des Herzens. Arch. f. d. ges. Physiol., 135: 417, 1910.

Smith, F. M.: The Ligation of Coronary Arteries with Electrocardiographic Study. Arch. Int. Med., 22: 8, 1918.

Smith, F. M.: Further Observations on the T-wave of the Electrocardiogram of the Dog Following the Ligation of the Coronary Arteries. Arch. Int. Med., 25: 673, 1920.

Pardee, H. E. B.: An Electrocardiographic Sign of Coronary Artery Obstruction. Arch. Int. Med., 26: 244, 1920.

Kahn, M. H.: The Electrocardiographic Signs of Coronary Thrombosis and Aneurysm of the Left Ventricle of the Heart. Boston M. & S. J., 187: 788, 1922.

Pardee, H. E. B.: Heart Disease and Abnormal Electrocardiograms with Special Reference to the Coronary T-wave. Am. J. M. Sc., 169: 270, 1923.

Levine, S. A.: Cases of Coronary Occlusion with Recovery. M. Clin. N. Amer., 8: 1719, 1925.

Willius, F. A. and Barnes, A. R.: Myocardial Infarction: An Electrocardiographic Study. J. Lab. & Clin. Med., 10: 427, 1925.

Rothschild, M. A.; Mann, H., and Oppenheimer, B. S.: Successive Changes in the Electrocardiogram following Acute Coronary Artery Occlusion. Proc. Soc. Exper. Biol. & Med., 23: 253, 1926.

Clarke, N. E. and Smith, L. J.: The Electrocardiogram in Coronary Thrombosis. J. Lab. & Clin. Med., 11: 1071, 1926.

Parkinson, J. and Bedford, D. E.: Successive Changes in the Electrocardiogram after Cardiac Infarction (Coronary Thrombosis). Heart, 14: 195, 1928.

Levine, Samuel A.: Coronary Thrombosis: Its Various Clinical Features. Medicine, 8: 245, 1929.

Barnes, A. R. and Whitten, M. B.: A Study of the R-T Interval in Myocardial Infarction. Am. Heart J., 5: 142, 1929.

Wilson, F. N.; Barker P. S.; Macleod, A. G., and Klostermyer, L. L.: The Electrocardiogram in Coronary Thrombosis. Proc. Soc. Exper. Biol. & Med., 29: 1006, 1932.

(4) Pardee, H. E. B.: Clinical Aspects of the Electrocardiogram. New York, Paul B. Hoeber, Inc., 1924, p. 82.

Wilson, W. J.: Cardiac Clinic, with Electrocardiographic Demonstrations. Ann. Clin. Med., 5: 238, 1926–27.

Levine, S. A.: Coronary Thrombosis: Its Various Clinical Features. Medicine, 8: 245, 1929.

Parkinson, J. and Bedford, D. E.: Successive Changes in the Electrocardiogram after Cardiac Infarction (Coronary Thrombosis). Heart, 14: 195, 1927–1929.

Pardee, H. E. B.: The Significance of the Electrocardiogram with a Large Q in Lead III. Arch. Int. Med., 46: 470, 1930.

Fenichel, N. M. and Kugell, V. H.: The Large Q-Wave of the Electrocardiogram. A Correlation with Pathological Observations. Am. Heart J., 7: 235, 1931.

Willius, F. A.: Occurrence and Significance of Electrocardiograms Displaying Large Q-Waves in Lead III. Am. Heart J., 6: 723, 1931.

Ziskin, T.: Clinical Significance of Electrocardiograms with Large Q-Waves in Lead III. Arch. Int. Med., 50: 435, 1932.

France, R.: The Large Q-Wave in Lead III of the Electrocardiogram. Am. J. M. Sc., 187: 16, 1934.

(5) Parkinson, J. and Bedford, D. E.: Successive Changes in the Electrocardiogram after Cardiac Infarction (Coronary Thrombosis). Heart, 14: 195, 1928.

Barnes, A. R.: Electrocardiographic Changes in Myocardial Infarction. Proc. Staff Meetings Mayo Clinic, 4: 132, 1929.

Barnes, A. R. and Whitten, M. B.: Study of T-Wave Negativity in Predominant Ventricular Strain. Am. Heart J., 5: 14, 1929.

Barnes, A. R. and Whitten, M. B.: Study of the R-T Interval in Myocardial Infarction. Am. Heart J., 5: 142, 1929.

Bell, A. and Pardee, H. E. B.: Coronary Thrombosis. Report of Two Cases With Electrocardiographic Localization of the Thrombus in the Right or Left Coronary Arteries. J. A. M. A., 94: 1555, 1930.

Barnes, A. R. and Ball, R. G.: The Incidence and Situation of Myocardial Infarction in One Thousand Consecutive Postmortem Examinations. Am. J. M. Sc., 183: 215, 1932.

Crawford, J.; Roberts, G. H.; Abramson, D. I., and Cardwell, J. C.: Localization of Experimental Ventricular Myocardial Lesions by the Electrocardiogram. Am. Heart J., 7: 627, 1932.

Wilson, F. N.; Barker, P. S.; MacLeod, A. G., and Klostermyer, L. L.: The Electrocardiogram in Coronary Thrombosis. Proc. Soc. Exper. Biol. & Med., 29: 1006, 1932.

Barnes, A. R.: The Electrocardiogram in Myocardial Infarctions: A Review of 107 Clinical Cases and 108 Cases Proved at Necropsy. J. A. M. A., 101: 2147, 1933.

(6) Gross, Louis: The Blood Supply to the Heart. New York, Paul B. Hoeber, 1921.

Philip William Nathan

1872–1935

Dr. Philip William Nathan died April 20, 1935. He was born in New York City, September 24, 1872.

He was graduated from the New York University Medical School in 1893. He continued his medical studies in the University of Berlin, where he remained for three years. During this time he was assistant to Professor Mendel in neurology.

In 1897 he went to the University of California where he held a research and teaching fellowship in biology. He remained there for two years, and upon his return in 1899 to the city he became connected with the staff of the Ruptured and Crippled and the Polyclinic Hospitals beginning the practice of medicine as a specialist in orthopedics.

In 1903 he was elected to Fellowship in the American Orthopedic Association, and in 1911 he was appointed to the position of attending orthopedist to The Mount Sinai Hospital, and he remained the head of the orthopedic service until his retirement last year.

Shortly after he became the attending orthopedist to Beth Israel Hospital and to the Montefiore Hospital. At the latter institution he was the attending orthopedist until the time of his death.

Early in his career he became particularly interested in the problems of arthritis dealing especially with the pathology and mechanical aspects of this disease. His interests were diverse and included significant contributions to various branches of orthopedic surgery. Prominent among these were works on bone transplantation, chondrodystrophia foetalis, poliomyelitis, lateral curvature, and rachitis. In 1932 he published an exhaustive and significant monograph on acute infections of the hip joint, which has exerted a wide influence upon the treatment of this condition.

Dr. Nathan was a fellow of the New York Academy of Medicine, the American College of Surgeons, American Orthopedic Association, and an honorary fellow of the Irish College of Surgeons. During the World War he served as a major in the United States Army.

Dr. Nathan's interests were very broad. He was an accomplished musician. While in Berlin he studied music at the Conservatory of Music. He was an enthusiastic collector of books and etchings and was an expert photographer. The photographs of Drs. Arpat Gerster and Julius Rudisch, which hang on the walls of The Mount Sinai Hospital, were made by him. He had a very broad cultural background. He was extremely kind towards

his patients and everyone with whom he came in contact. He had a very critical mind. He could not tolerate sham in any form. He was frequently extremely outspoken in his criticism but he was never unjust. His wit was caustic and his criticism sharp but never offensive. It was always stimulating and he never failed to criticize himself.

Although he had retired from The Mount Sinai Hospital, he was looking forward to undertaking further research in orthopedics at the Bellevue Hospital. He had about completed a work on orthopedic surgery. In writing this book he had been applying himself with great diligence over a number of years. He was not content to write until he had mastered every phase of his subject. Shortly before his death he had completed an exhaustive study of the chemistry of the muscles and formulated in his own mind what he considered to be valid in this difficult field. This exhaustive painstaking research was characteristic of his desire to get at fundamental truths.

All of us who had the privilege of knowing Dr. Nathan appreciated his sterling qualities. He was at all times a stimulating and entertaining companion and a steadfast friend.

ISRAEL STRAUSS.

Leon Irving Sass

1910–1935

An untimely and sudden death on July 12, 1935 brought to an abrupt end the life of Dr. Leon Irving Sass, at the threshold of his medical career.

Dr. Leon I. Sass was born in Brooklyn, New York on December 11, 1910, and was educated in the public schools of that borough. He obtained his pre-medical training at Columbia College from which he was graduated in 1931 with the degree of Bachelor of Arts. He received his Doctor's degree in June of this year from the College of Physicians and Surgeons of Columbia University, where his scholastic attainments placed him second in his class at graduation. He was a member of the Phi Beta Kappa and Alpha Omega Alpha fraternities.

At the time of his death Dr. Sass had just begun his internship at The Mount Sinai Hospital, where he was noted for his genial manner and pleasant personality.

It was my privilege to have known Dr. Sass for the last eight years, during his college and medical school days, and I, as many others, was impressed by his brilliancy and likeable personality. In all his undertakings, whether scholastic, social, or professional, he injected a delightful sense of humor. All those who knew him deeply mourn the loss of so promising a recruit to the ranks of medicine.

LEON N. GREENE.

ABSTRACTS

Authors' Abstracts of Papers Published Elsewhere by Members of The Mount Sinai Hospital Staff

Head Injury—Its Neurologic and Psychiatric Aspects. Israel Strauss and Nathan Savitsky. Arch. Neurol. & Psychiat. 31: 393, May 1934.

The various techniques available for the study of cases of head trauma are reviewed. These include a careful neurological examination with special attention to detail; a psychologic and psychiatric survey with emphasis on a study of the conscious processes of the injured, utilizing various methods known to experimental psychology; an ophthalmologic investigation including field studies and analysis of various types of visual disturbances; oto-neurological studies which include an accurate determination of auditory acuity and vestibular tests; and a study of the spinal fluid including encephalography. These methods must be used carefully and critically.

The organicity of the post concussion syndrome is emphasized. This term is used to designate a series of subjective complaints following head injuries: paroxysmal headache, dizziness, fatiguability and difficulty in thinking.

The frequency and importance of secondary psychologic elaborations are discussed. These psychogenic complications usually appear a long time after the injury, and are usually a result of the social and economic maladjustments resulting from the injury.

Nineteen illustrative cases are reported, showing the results of such special investigations. The presence of a few psychogenic features in a particular case does not rule out the presence of organic disease. Two cases of traumatic ring scotoma are reported; one of traumatic alexia with superimposed hysteria; two cases with low spinal pressure following injury; one with epileptic seizures following trauma and encephalography; six cases with encephalographic findings and post concussion syndrome; four cases of head injury subjective syndrome where no compensation problem existed; and four cases with severe sequellae following head injury and no initial loss of consciousness. No opinion should be formed in doubtful cases without a systematic clinical survey.

Quinine and Ergot Allergy and Thrombocytopenic Purpura: Report of a Case. M. Murray Peshkin and Julius A. Miller. J. A. M. A. 102: 1737, May 1934.

A case is reported demonstrating a definite allergic relationship between such drugs as ergot and quinine and thrombocytopenic purpura. The family history of the patient was negative to allergy. In 1924, at the age of 20, the patient had taken only four doses of fluid extract of ergot, each dose containing 4 gm. of the extract at intervals of four hours because of suspected pregnancy. The following day hemorrhage into the skin and mucous membranes occurred and persisted for nine days. Three years later (1927), because of being "run down," her physician decided to administer a course of "tonic injections." The day following the first and only injection, profuse bleeding began from the gums and mucous membranes of the mouth, and purpuric spots appeared on both legs. Although she had just completed a menstrual period, bleeding began anew. Several days later blood appeared in the

stools and urine. Examination of the blood showed the bleeding time to be three minutes and coagulation time four minutes along with an absence of clot retraction and a platelet count of 130,000.

The patient seemed well for five years (from 1928 until February 8, 1933). At that time she took in the course of one day 0.65 gm. (10 grains) of quinine sulphate with eight capsules of ergot (the dosage being unknown) for "delayed menstruation." That night bleeding from the gums and vagina with purpura ensued. Blood studies indicated secondary anemia. The platelet count was 100,000; coagulation time, four minutes; bleeding time, eight minutes. Twelve days later the patient had taken 0.09 gm. of quinine hydrochloride in three doses. Bleeding commenced that night and lasted for two days.

The cutaneous tests with ergot, quinine alkaloid, and quinine salts were performed and repeated at varying intervals. Ergot extracts showed negative reactions with the scratch, intradermal and passive transfer tests. Quinine alkaloid and quinine salts all showed positive reactions with the scratch test. The quinine alkaloid and quinine salts are levorotatory. The dextrorotory quinine derivatives, quinidine alkaloid and quinidine sulphate, showed negative cutaneous reactions. Passive transfer tests with an extract of quinine alkaloid and quinine dihydrochloride each showed a positive reaction.

Quinidine sulphate was orally administered without inducing any symptoms, while ergot caused bleeding.

Acute Cholecystitis. A. S. W. Touroff. Ann. Surg. 99: 900, June 1934.

Acute inflammatory changes may be present in the gall bladder of a patient who presents only minimal or no clinical manifestations at the time of operation. The pathological changes found by the author in seventy-five such cases ranged from simple acute to hemorrhagic, suppurative, and gangrenous inflammation; empyema; perforation, and pericholecystic abscess. In general, the patients with minimal manifestations showed a considerably higher incidence of advanced and progressive lesions than the patients without manifestations at the time of operation. Eighty per cent of the lesions in the series were considered conservatively to be subsiding or capable of subsiding. The remaining 20 per cent were considered progressive. The exact nature and extent of the inflammatory lesion before operation can not be determined. Early operation is indicated in cases of acute cholecystitis in which subsidence once begun does not proceed uninterruptedly, fairly promptly, and completely. In cases of acute cholecystitis with subsided clinical manifestations, operation, early rather than late, in the interval following subsidence of the clinical manifestations of acute cholecystitis is advised because of the danger of the existence of a silent acute lesion.

Note on the Procedure in the Kuttner-Lichtenstein Microcolorimetric Method for the Determination of Organic Phosphorus. David Glick. J. Lab. Clin. Med. 19: 1012, June 1934.

Technical improvements of analytical method used routinely, e.g. for lecithin in serum, are reported.

Periosteal Ossification in Myelogenous Leukemia. Joseph C. Ehrlich and Samuel Forer. Arch. Int. Med. 53: 938, June 1934.

This is a report of a case of "acute" myeloid leukemia which presented the clinical picture of acute rheumatic fever. Necropsy established the coexistence of both diseases. Periosteal elevation of the left humerus observed by X-ray at the beginning of the clinical course was found to have resulted from repeated subperiosteal leukemic infiltrations with ossification in layers.

Priapism of Psychogenic Origin. C. P. Oberndorf. Arch. Neurol. & Psychiat. 31: 1292, June 1934.

This is a report of a case of priapism in a young West Indian negro lasting thirty-six days and treated in The Mount Sinai Hospital. All organic causes for the priapism were excluded. The psychic situation revealed a marked incestuous relationship to a sister which was repressed. Nevertheless, the priapism was preceded by prolonged ungratified erections which seemed to culminate in a prolonged priapism. The literature is reviewed.

Avertin (Tribromethanol) Anesthesia in Normal Persons. Ernest E. Arnheim and Lester R. Tuchman. Arch. Surg. 29: 1, July 1934.

Avertin anesthesia was studied in fifteen normal people with a view to obtaining information on the uncomplicated effects of the drug. The observations were recorded (1) in repose, immediately before the administration of the drug, (2) one hour after its introduction when the anesthesia was at its height and (3) four hours after its introduction, toward the end of anesthesia. No auxiliary medication was given. The patients were healthy persons admitted to the surgical service for such operations as inguinal hernioplasties. The operations were subsequently performed after the avertin studies were completed. In this series, the significant changes produced by the avertin were:

1. An average increase in the pulse rate of 16 per minute and an average increase in the respiratory rate of 6 per minute.
2. A decrease in the amplitude of respiration.
3. An average decrease of 1.3°F. in the rectal temperature.
4. An average decrease in the systolic blood pressure of 24 mm.
5. An average decrease in the basal metabolism of 22 per cent.
6. An average decrease in the clotting time of three minutes.
7. A slight early rise in the blood sugar, a slight fall in the carbon dioxide content of the blood and a slight rise in the plasma volume.
8. A negligible change or no change in the venous pressure, blood cholesterol and cholesterol ester, blood calcium, blood chlorides and the formed blood elements.
9. Slight oliguria and an increase in the specific gravity of the urine.
10. Loss of the conjunctival and tendon reflexes with a late preservation of cutaneous and pharyngeal reflexes.

Cerebral Complications of Putrid Pleuropulmonary Suppuration. Ira Cohen. Arch. Neurol. & Psychiat. 32: 174, July 1934.

Nineteen cases of pleuropulmonary suppuration presenting cerebral complications are reviewed. The author points out the frequency of brain involvement in this type of suppuration compared to its rarity in other types even in the presence of a bacteremia. Infected embolus is recognized as the source of brain abscess (of which there were seven cases). Another group, where spontaneous recovery ensued or death was immediate, is considered under the heading of aseptic emboli. There were ten of such cases. In a third, small group of two cases psychotic manifestations were dominant and the presence of aseptic emboli in the frontal lobes is postulated.

Studies on the Myocardial Aschoff Body. I. Descriptive Classification of Lesions. II. Life Cycle, Sites of Predilection and Relation to Clinical Course of Rheumatic Fever. Louis Gross and Joseph C. Ehrlich. Am. J. Path. 10 (4): 467, 489, July 1934.

I. The clinical histories and anatomic material from seventy cases of uncompli-

cated rheumatic fever with Aschoff bodies in the myocardium were studied. A classification of Aschoff bodies is suggested, based on the appearance and distribution of the collagen, argentophilic fibers, cell cytoplasm and nuclei, and including seven types of Aschoff bodies which apparently bear some relation to the life cycles of the lesions.

II. A study is presented on the life cycle of the myocardial Aschoff body, based on the clinical records and autopsy material from seventy cases. These specific lesions pass through three stages; the earliest phases, represented by small cell coronal and reticular Aschoff bodies, occur up to the fourth week after the onset of the illness. The middle phases, represented by large cell coronal, syncytial coronal, mosaic and large irregular cell polarized Aschoff bodies, occur between the fourth and thirteenth week after the onset. The late phases are represented by polarized Aschoff bodies which occur after the thirteenth week. The earliest types of specific lesions are apparently influenced in their response by the reactivity of the tissue, depending on whether there has or has not been a previous attack of rheumatic fever, and also by the state of the collagen present in the interstices between the myocardial bundles. As a consequence, the evolution of the lesion may follow one of two main courses, determined by the initial lesion. Dividing the material into four groups representing different clinical courses, there appears to be some change both in the incidence of the types of Aschoff bodies present in the myocardium and in their localization.

The Sugar Tolerance in Siblings of Juvenile Diabetic Patients. Harry S. Mackler and Alfred E. Fischer. J. A. M. A. 103: 240, July 1934.

The authors sought to evaluate the dextrose tolerance test in the sisters and brothers of juvenile diabetics as a means of detecting a diabetic tendency in them. They carried out dextrose tolerance tests on thirty siblings and found them all to be approximately within normal range except for five who gave slightly suspicious curves. None had any glycosuria. Five years later 21 of the 30 previously examined, including the five who gave suspicious curves, were re-examined for glycosuria and found to be negative. The authors conclude that in juveniles the sugar tolerance test holds little promise as a means of detecting a diabetic tendency inasmuch as diabetes in childhood, unlike that of adults, generally has a sudden onset.

A Lowered Mortality in Acute Appendicitis and the Basis Therefore. Ernest E. Arnheim and Harold Neuhof. Surg. Gynec. & Obst. 59: 189, August 1934.

Intraperitoneal suppuration and not some distant complication is the usual cause of death after operation for acute appendicitis. Death should occur only rarely after operation for acute phlegmonous appendicitis, appendicitis with local peritonitis, or appendicitis with abscess, unless diffuse peritonitis also exists at the time of operation.

A comparison of the mortality of the severer forms of acute appendicitis on one surgical service in two successive three year periods shows a marked reduction in the second period except in the category of diffuse peritonitis. The factors contributing in varying degree to this lowered mortality are discussed under several headings: diagnostic features, preoperative treatment, the choice of time for operation with special reference to appendicitis abscess, anesthesia, general principles of operation, choice of incision, carefully executed operation under full visualization with minimal soiling, gauze drainage, postoperative management, the search for and timely drainage of complicating foci.

Gonococcemia with Recovery. Report of Four Cases. Charles K. Friedberg. Am. J. M. Sc. 188: 271, August 1934.

Although there is abundant evidence that arthritis, tenosynovitis and other com-

monly observed benign gonorrheal complications result from the invasion of the blood stream by gonococci, nevertheless, published observations reveal that only rarely are gonococci isolated from the blood in such instances. Only seven cases of gonococcemia have recovered without a persisting cardiac lesion, and there have been several instances of gonococcemia and endocarditis with a valvular deformity. Within two years the author observed four cases of gonococcemia, three of whom recovered without and one with a valvular deformity. Unlike some of the previously reported cases, these recoveries occurred under conservative therapy without any radical attempt to remove the source of infection. The author emphasizes the importance of frequent and careful blood cultures in making the diagnosis, in addition to thorough clinical observation. The prognosis is dependent chiefly on the presence of a complicating endocarditis which is indicated by embolic phenomena and the development of persistent diastolic murmurs. Recovery generally occurs if there is no complicating endocarditis, and the presence of the latter gives an unfavorable prognosis.

The Pathogenesis of Osteoarthritis. Edgar M. Bick. Acta Rheumatol. 6: 4, August 1934.

Osteoarthritis is defined as a non-infective degenerative process involving the articular tissues. A study of its pathogenesis from the anatomic, physiologic, pathologic and clinical aspects all lead to the same conclusion. The morbid process is conditioned by a local passive hyperaemia, a chronic passive congestion of the articular and periarticular tissues.

Periarteritis Nodosa (Necrotizing Arteritis) Associated with Rheumatic Heart Disease. (With a note on Abdominal Rheumatism). Charles K. Friedberg and Louis Gross. Arch. Int. Med. 54: 170 August 1934.

The authors observed a significant association of periarteritis nodosa with rheumatic heart disease. Of eight cases of typical periarteritis nodosa observed in the last two years and verified at necropsy, four presented evidence of rheumatic heart disease, i.e., a history of rheumatic fever and clinical evidence of rheumatic cardiovalvular disease. Also symptoms such as abdominal pain and orchitis were frequently observed in periarteritis nodosa. Post mortem examination revealed characteristic gross and histologic features of rheumatic heart disease, including the presence of myocardial Aschoff bodies in every case. The evidence in the literature showing the association of rheumatic fever and periarteritis nodosa is only suggestive in character. Aside from their four cases the authors have been unable to discover any others in which there was unquestionable heart disease associated with periarteritis nodosa. However, it seems probable that many cases of periarteritis nodosa previously reported may have been regarded as presenting rheumatic cardiac lesions had they been studied from this point of view. In three of the four cases the symptoms of the final illness were due both to an acute attack of rheumatism and to the lesions of periarteritis nodosa. In the fourth case, there was no obvious evidence of active rheumatic infection. Nevertheless, an acute rheumatic lesion was found in the heart. The authors conclude that they are not dealing with two unrelated diseases, but that periarteritis nodosa is one of the types of arterial lesions due to the rheumatic infection. In two cases, an attack of scarlet fever occurred eight weeks preceding the final illness. In another, in addition to the periarteritis, the clinical and pathologic features of malignant nephrosclerosis were added to those of rheumatic fever, and in two cases the abdominal symptoms, so common in periarteritis nodosa, dominated the clinical picture sufficiently to lead to an exploratory operation. The authors suggest that when acute abdominal symptoms

are present in a patient suffering from rheumatic fever, complicating periarteritis nodosa should be considered. This complication is offered as an organic basis for some of the cases of so-called abdominal rheumatism.

Present Endocrine Diagnosis and Therapy. Robert T. Frank, Morris A. Goldberger, and Frank Spielman. J. A. M. A. 103: 393, August 1934.

This article is a critical survey of the work performed in the authors' laboratory from the years 1926 to 1933 inclusive. The material comprises a large number of tests for the female sex and anterior pituitary-like hormones in the blood and urine of both normal women and those showing functional ovarian disturbances. These disturbances are divided into two groups. First, underfunction of the ovaries, including sterility, amenorrhea, dysmenorrhea, oligomenorrhea, and the menopause; and second, overfunction, including puberty bleeding, maturity menorrhagia and metrorrhagia, preclimacteric hemorrhages, and premenstrual tension. Numerous graphs illustrate the results of the studies in the different types of cases. From the standpoint of therapy, the lack of value of "endocrine" preparations is stressed. With rare exceptions symptomatic treatment based on thorough study of the individual case gives the best results.

Tumor of the Orbit in a Case of Osteochondrofibro-Sarcomatosis. I. Goldstein and D. Wexler. Arch. Ophth. 12: 201, August 1934.

In this case of sarcomatosis in a man aged 27, proptosis of the left eye was caused by a mass arising from the left great wing of the sphenoid. The tumor was a rapidly growing fibrosarcoma containing, in addition, immature cartilage and bone. Similar growths were found in all the vertebrae and ribs, and in the skull, sternum, pelvic bones, left humerus, and scapula. Although the first symptoms pointed to a growth in the dorsal spine, it is likely that the affected bones were more or less simultaneously involved, i.e. multiple sarcomatosis.

Members of the hospital staff and the out-patient department of The Mount Sinai Hospital are invited to submit for publication in this column brief abstracts of their articles appearing in other journals.

REMINDER

The new edition of "The Mount Sinai Hospital Manual of Procedures for the House Staff," for which there is a nominal charge of one dollar, is on sale at the Cashier's Office, main floor, of the Hospital.

The manual consists of 102 pages with illustrations and is a useful, up-to-date, practical work on clinical pathology and the technic of therapeutics as carried out at the Hospital. It should be in the hands of every member of the Staff.

VOLUME II JANUARY-FEBRUARY, 1936 NUMBER 5

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

RETROTRACHEAL AND RETROESOPHAGEAL GOITER

RICHARD LEWISOHN, M.D.

While intrathoracic goiters are not uncommon, the extension of the goiter into the planes between the oesophagus and the vertebral column is a comparatively rare occurrence. This variety is commonly called retroesophageal goiter. The fact that among over 200 cases of goiter, operated on my service during the last three years, no similar case was observed, indicates the rarity of this special group.

CASE REPORT

History (H. N. 377122). A 42 year old housewife was admitted to the hospital on February 27th, 1935. She had noticed a progressively increasing mass in her neck for the last seven years and hoarseness and slight dysphagia for nine months. She had some difficulty in breathing, mainly on exertion, and could not sleep at night unless she was in a fairly upright position.

Physical examination showed a large goiter occupying both the right and left sides of the neck with a broad isthmus in front of the trachea. The trachea was displaced to the left. The posterior aspect of this goiter could not be felt either on the right or left side. It seemed to extend behind the trachea.

X-ray examination of the neck in the antero-posterior position showed the trachea to be slightly deviated to the left. A film taken in the lateral position showed that we were dealing with a retrotracheal goiter, as the trachea was pushed far forward and appeared somewhat angulated (Fig. 1). Examination of the upper portion of the oesophagus after the administration of a thick barium mixture showed it to be displaced approximately 2 centimeters forward. A portion of the mass also appeared to lie between the trachea and the oesophagus (Fig. 2).

Laryngoscopic examination showed a paralysis of the right vocal cord. The left vocal cord showed normal mobility.

After a few days of Lugolization the patient was operated on the 4th of March, 1935, under avertin anaesthesia. The laryngologist was present in order to introduce a bronchoscope should there be any difficulty in

breathing. However, his services were not required, as the patient took a smooth anaesthesia.

Operation. Typical collar incision. Division of the long ribbon muscles on both sides of the neck. The vessels on the right upper pole were ligated and cut. The isthmus was divided between clamps and the trachea was laid bare for about two inches. After the right lobe had thus been mobilized, it was seen that a hard mass, about the size of an egg, originated from



FIG. 1. Lateral view. Trachea pushed forward

the right upper pole and developed retrotracheally between the trachea and the vertebral column. After a few layers overlying this mass had been split the mass could easily be shelled out from its bed and brought forward. It was then resected with the remaining part of the right lobe. The vessels were then divided at the left upper pole and it was noted here that a cystic mass about the size of an egg originated from this pole and developed in the same plane, antevertebrally and retrotracheally, thus

pushing the trachea forward. These two masses, the one from the right pole and the one from the left pole, met at about the median line (Fig. 3). The large cyst on the left side was then enucleated and resected with part of the left lobe. The left lobe was sewn over by a few stitches. The same procedure was followed on the right side. Two packings were put into the beds of the wounds, one on the right and one on the left side. The rib-



FIG. 2. Lateral view of retroesophageal goiter with angulation of oesophagus

bon muscles were reunited and the skin was closed by a subcuticular stitch and clips.

Pathological report: Papillary adenoma and micro- and macrofollicular colloid adenoma (Fig. 4).

The specimen consists of two portions of thyroid tissue. One portion presents a cystic area and a more solid portion. The cystic portion is oval and measures 5 x 4 x 4 cm. The more solid portion is irregular and half that size. The second specimen appears quite firm. There is an oval shaped mass which is quite firm, has a whitish-yellow appearance exter-

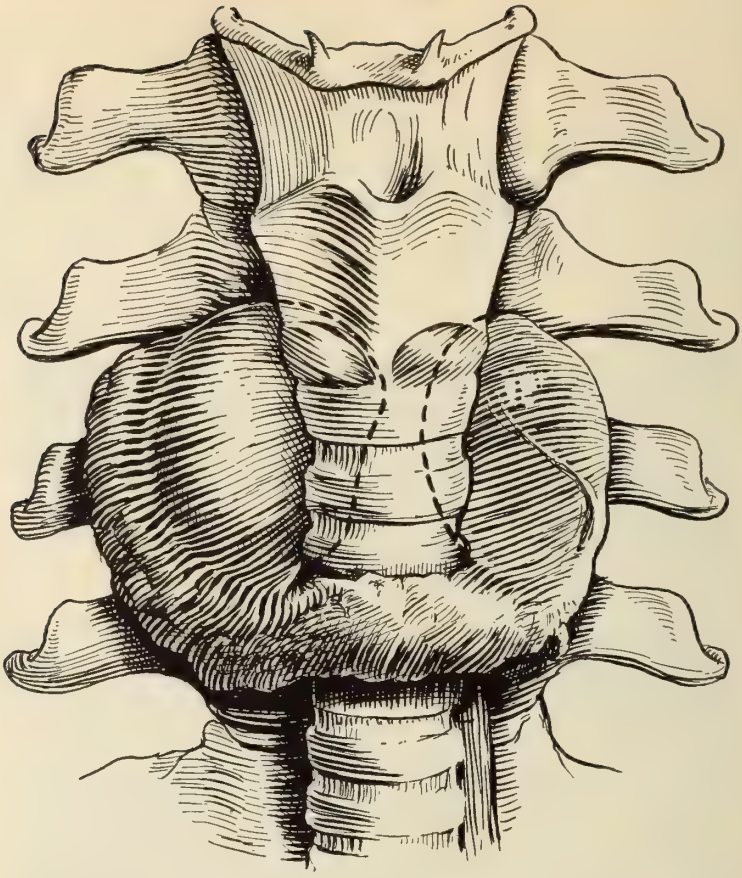


FIG. 3. Retrotracheal and retroesophageal goiter (schematic)

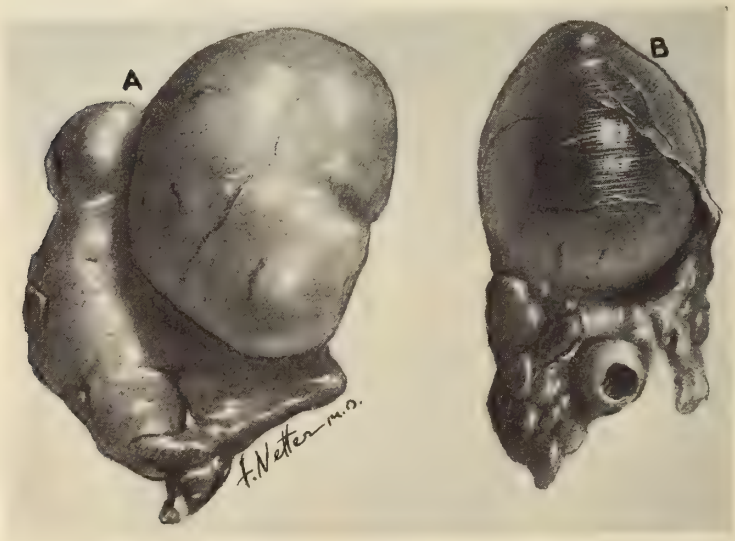


FIG. 4. Specimen of retroesophageal goiter. (*a*) Right lobe and isthmus; (*b*) left lobe



FIG. 5. Lateral view after operation. Trachea now in normal position



FIG. 6. Lateral view after operation. Oesophagus in normal position

nally and measures 6 x 4.5 x 3.5 cm. Attached to it is a flattened, irregular, cystic and solid portion of tissue measuring 6.5 x 3 x 2.5 cm.

Postoperative Course. The patient made an uneventful recovery and was discharged from the hospital on the 16th of March, 1935. Laryngoscopic examination on the day of discharge showed the same findings as before the operation.

Re-examination of the neck showed the trachea now to be in practically normal position. The retrotracheal space is possibly slightly widened (Fig. 5). The oesophagus is now in normal position (Fig. 6). Through the neck are seen several collections of air which were probably introduced at operation.

COMMENT

The pre-operative diagnosis of retroesophageal goiter is usually missed, unless lateral pictures of the neck are taken. A careful study of any large goiter for retrotracheal and retroesophageal extension is of the utmost importance. While other large non-toxic goiters may not necessarily require immediate operation, the retrotracheal goiter, similar to the intrathoracic variety, presents an absolute indication for operation, in order to prevent possible sudden interference with respiration.

NODAL BIGEMINY

Observations on the Dynamics of Nodal Extrasystoles*

SIMON DACK, M.D. and HERMANN MOND,† M.D.

[*From the Out-Patient Department and the Cardiographic Laboratory*]

Observations in a patient with arrhythmia of nodal origin are of interest because an unusual opportunity is thus obtained to study the dynamics of nodal impulse formation. Extrasystoles arising in the A-V node are less common than those arising in the auricle or ventricle, and their recognition is more difficult. While their presence may frequently be suspected when the premature ventricular complexes appear to be of supraventricular origin and are not preceded by a premature P-wave, more cogent criteria are needed to prove their localization in the Aschoff-Tawara node. The diagnosis can be established only if it is shown that both auricular and ventricular complexes are more or less simultaneous as well as premature with respect to the normal cycle (1). Frequently the extrasystolic P-wave is fused with the QRS complex in such a manner that its exact location in the cycle can not be determined in the electrocardiographic tracing (2). Both criteria (that the auricular and ventricular complexes are simultaneous as well as premature with respect to the normal cycle) usually can be satisfied only with the aid of venous pulse tracings taken simultaneously with the electrocardiogram. Such studies have been carried out in the case to be reported.

CASE REPORT

History (H. N. 346864). A sixty-one year old laundress was first observed in the Out-Patient Department of the hospital in 1924 when she complained of precordial oppression, epigastric discomfort, palpitation, and dyspnea on exertion. These symptoms persisted until her admission to the hospital in December 1932. Except for frequent premature beats, the heart was found to be normal. Fluoroscopic examination revealed a vertical heart, no enlargement of any of its chambers, and a moderately dilated and tortuous aorta. The blood Wassermann reaction was negative.

The patient was seen again in the Cardiac Clinic in September 1934. She now had persistent discomfort in the precordium and in the epigastrium which was aggravated by exertion. She was also frequently conscious of an irregular heart action. Physical examination now revealed the heart

* Presented at the Clinical Conference, March 22, 1935.

† Deceased.

to be slightly enlarged to the left; the first apical sound was split, and the second aortic sound was accentuated. The blood pressure was 140 systolic and 80 diastolic, and the apex rate was 90 beats per minute. The regularity of the rhythm was disturbed by numerous premature beats, some of which were not conducted to the radial pulse.

Electrocardiographic Study. A routine electrocardiogram taken at this

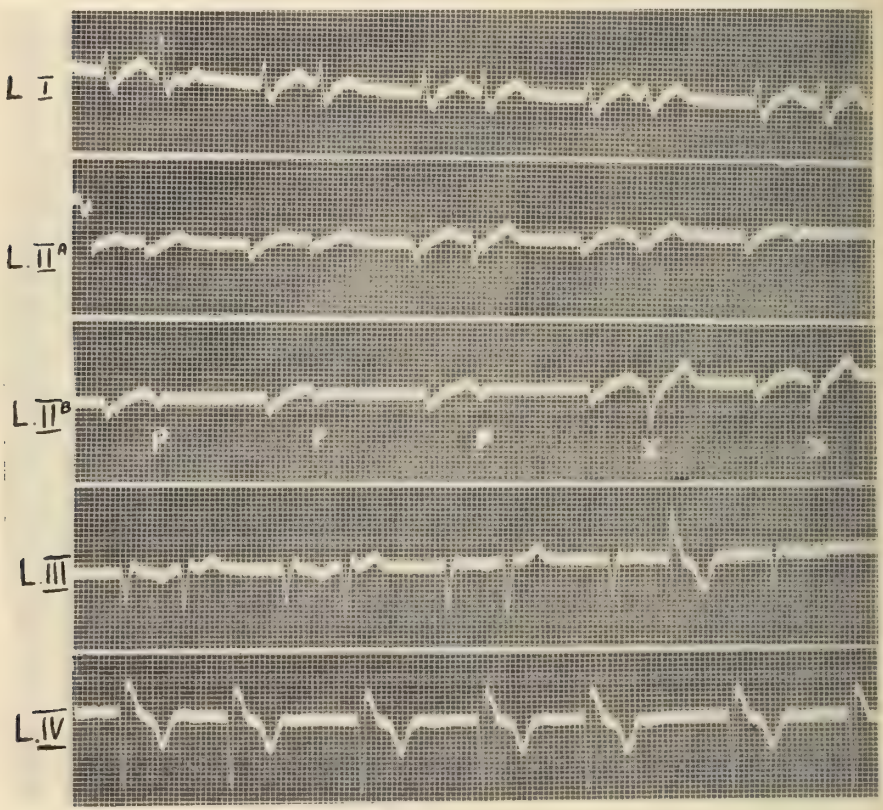


Fig. 1. Electrocardiogram in conventional and chest leads. Strict coupling of aberrant ventricular complexes in the conventional leads. An occasional inverted P-wave is seen replacing the coupled extrasystole. Note the variation in the configuration of the extrasystolic complexes.

time is illustrated in figure 1. It shows a bigeminal rhythm with a varying interval between each couple. The initial beats of each couple are all similar and consist of an aberrant QRS complex and a normal T-wave. The QRS complex is widened to 0.14 seconds and is notched and slurred, suggesting an intraventricular conduction defect. The second beat of the couple resembles the first beat but shows frequent variations in form, amplitude and direction. At times the change in configuration of this

complex is so marked as to suggest partial bundle-branch block. Throughout the record there is an apparent absence of auricular activity, since no P-waves can be seen preceding the QRS complexes. However, the second beat of a couple is occasionally replaced by a small inverted deflection which follows the preceding T-wave. This deflection has the appearance of an inverted P-wave. In the precordial lead, the regular coupling has disappeared, the rhythm has become more irregular, and no definite P-waves are visible.

The nature of the dominant rhythm in this record was obscure. The absence of auricular fibrillatory waves with a totally irregular rhythm and the presence of the peculiar hooked-shaped deflections resembling inverted P-waves was puzzling. It was evident that the diagnosis of premature auricular or ventricular contractions did not explain all the variations in the arrhythmia. We therefore resorted to the study of the venous pulse recorded simultaneously with the electrocardiogram in order to determine the presence or absence of auricular contraction, and the relationship of the peculiar hooked-shaped deflections to auricular and ventricular activity.

Venous pulse tracings were performed with the aid of a Frank capsule covered with a fine rubber elastic membrane. A thin beam of light was projected in a typical manner upon a small mirror attached to the edge of the capsule and from there was reflected against the slit of the camera simultaneously with the electrocardiogram. As the Frank capsule was placed quite near to and at the same level with the projection microscope of the galvanometer, there was no appreciable deviation on simultaneous records of the light beam and string shadow.

Figure 2 illustrates the findings. The fundamental rhythm in this record is of sinus origin and the arrhythmia found at the previous examination is present only intermittently. This tracing, therefore, furnishes the additional advantage of comparing the arrhythmia with the normal sinus sequences. The latter show a normal venous pulse. The *a* wave is well developed, its upstroke beginning about 0.09 to 0.10 seconds after the onset of the P-wave. It is followed by a sharply rising *c* wave, the onset of which has approximately the same relation to the beginning of the QRS complex (0.10 seconds). The systolic collapse is typically present and lasts until the end of ventricular systole, as indicated by the return of the T-wave to the iso-electric level. A moderately large *d* wave indicates the beginning of diastole in the venous pulse. The reliability of the venous pulse record is well shown by comparing the *a-c* interval with the P-R interval. Both vary between 0.16 and 0.19 seconds.

The third beat in the record is definitely a premature contraction. As there is no change in the configuration of the ventricular complex, it is probably supraventricular in origin. A P-wave precedes this ventricular complex by a very short interval (0.08 seconds), but is itself not premature as it follows the previous auricular contraction by the interval of a normal

cycle. These relations are even more clearly denoted in the venous pulse tracing in which the sharp onset of the auricular waves admits of accurate measurement. When the extrasystole appears in the electrocardiogram, a *c* wave is seen to intercept the downstroke of the preceding auricular contraction into which it falls. A normal cycle originating in the sinus node follows. About 0.2 seconds after the inception of this normal ventricular contraction, immediately following its T-wave, there is seen a small downwardly directed deflection which we have encountered in the electrocardiographic tracing described above (Fig. 1). The venous pulse tracing shows this to be definitely an auricular wave which appears at the end of

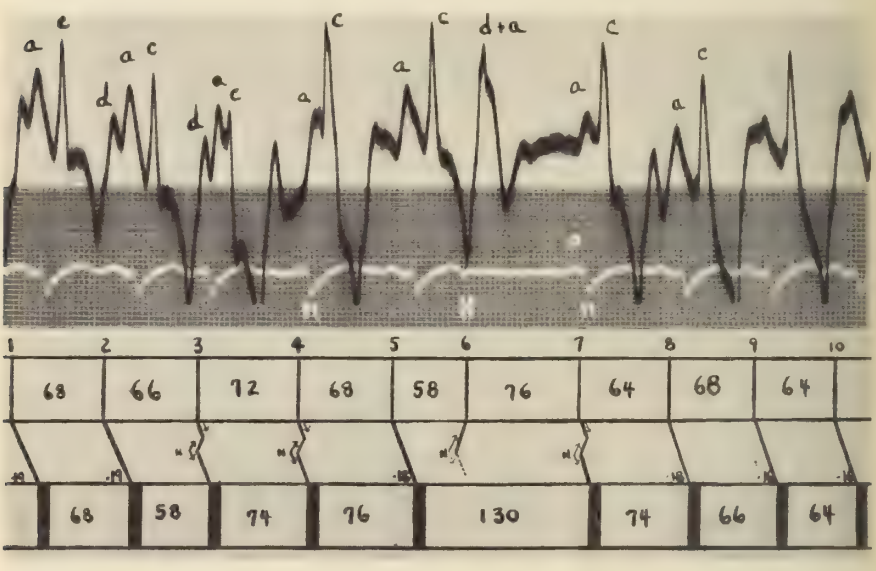


FIG. 2. Venous pulse simultaneous with electrocardiogram. Complexes 3, 4, and 7 are typical nodal beats. Complex 6 is a nodal extrasystole, the ventricular portion of which is blocked. The nodal beats are easily recognized in the venous pulse by the wide combined wave comprising *a* and *c*.

the ventricular contraction of the preceding beat. It is characteristically increased in size because the ventricle is not yet completely relaxed.

This record contains all the elements necessary for the analysis of the arrhythmia. The first premature beat is obviously an extrasystole arising from the junctional tissues, most probably in the Tawara node. As it occurs late in the cycle, it is partly preceded by the sinus-excited auricular contraction from which it is independent. The next beat is again a nodal beat of similar character. In both instances there is no retrograde extension of the impulse from the extrasystolic focus, as the auricle is already activated by the sinus node. The two contraction waves, one from the sinus node passing downward and one from the Tawara node spreading

upward, meet and counteract each other. On the other hand, the small inverted wave following the fifth ventricular complex, which we have shown to be a P-wave, is definitely premature. Were we to assume that this is an ordinary auricular extrasystole which occurs too early in the cycle to be conducted to the ventricle, then this patient would exhibit two types of extrasystoles, auricular and nodal. However, numerous other records of this patient show that we are dealing with only one extrasystolic focus in the Tawara node. The proof is furnished by the next record (Fig. 3). Here we see on one strip a coupled extrasystole occurring first in the form

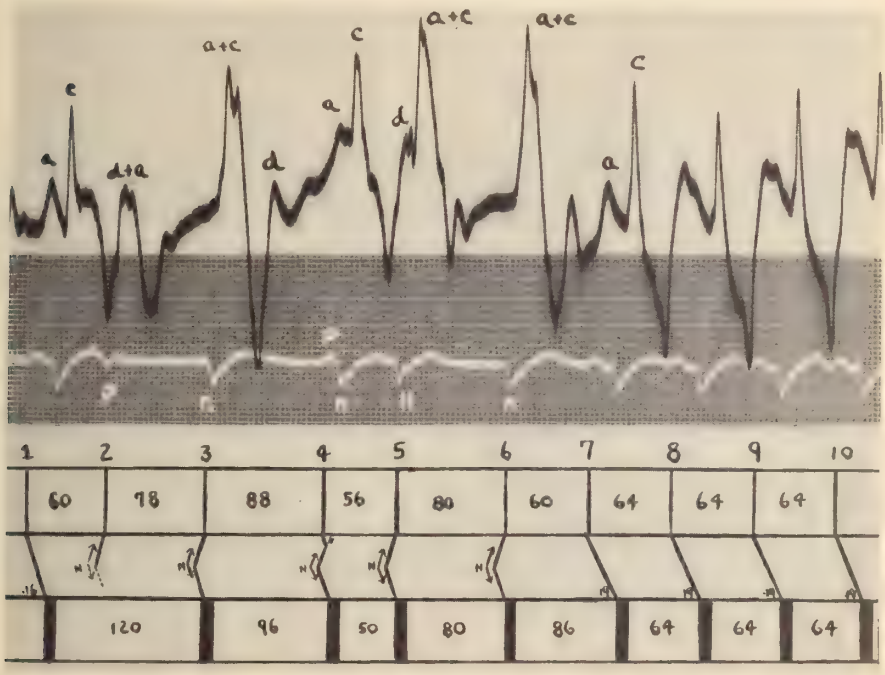


FIG. 3. Electrocardiogram and venous pulse. Complexes 2, 3, 4, 5, and 6 are all of nodal origin.

of an isolated inverted P-wave (complex 2), and then in the form of a simultaneous contraction of auricle and ventricle (complex 5). The venous pulse tracing in this cycle shows a large *a* wave mixed with the *c* wave of the extrasystolic contraction. The mixture of the *a* and *c* waves is well depicted by the considerable widening and increase in amplitude of the wave-complex accompanying the ventricular contraction. Here again it is interesting to note the characteristic tendency of the nodal extrasystole to induce a nodal escape or automatic beat in the following cycle (complexes 3 and 6).

An important argument in favor of the nodal origin of all the premature beats, whether occurring as isolated auricular contractions or combined auricular and ventricular beats, is the approximate constancy of the coupling interval. The occurrence of nodal extrasystoles in the form of isolated auricular contractions is a phenomenon which so far has escaped attention. It shows that nodal extrasystoles may have their ventricular portion blocked because of insufficient recovery, if they fall early enough in the cycle to encounter a refractory conducting system. This is further supported by the fact that many of the conducted extrasystoles show slight but definite changes in the configuration of the ventricular complexes, changes obviously due to incomplete recovery of some of the conducting

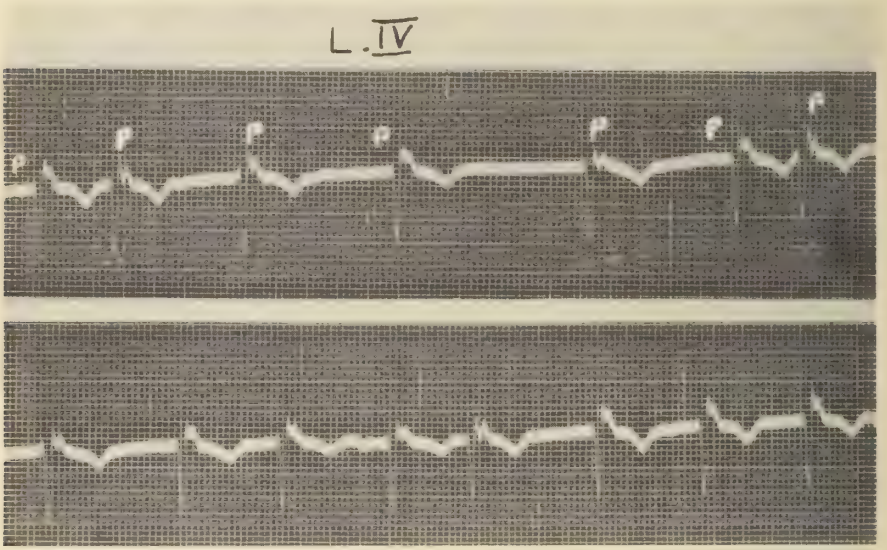


FIG. 4. Antero-posterior chest lead. The nodal beats are characterized by sharp spikes superimposed upon the QRS complexes.

fibers. In a few instances, as seen in figure 1, the change in the configuration is so marked as to suggest the appearance of bundle-branch block. This behavior of nodal extrasystoles is by no means unexpected as the exact counterpart is observed in the case of ordinary auricular extrasystoles. The latter also frequently show varying degrees of conduction disturbances, depending upon the prematurity of the impulses and resulting in aberrant QRS complexes (1, 3). Complete blocking of the ventricular portion of auricular extrasystoles has been previously observed (4).

Now the strange arrhythmia of figure 1 becomes easily comprehensible. There is strict coupling of nodal extrasystoles, each being followed by an induced nodal beat. The sinus node is thus entirely excluded. Most

P-waves remain entirely invisible, being hidden in the broadened ventricular complexes. Only when the ventricular portion of a nodal beat is absent because of block, does an isolated inverted P-wave appear in place of the usual complete contraction. The curve also illustrates the varying forms of ventricular complexes due to partial recovery of the conducting system.

COMMENT

The analysis in this case was possible only by ascertaining the exact position of the auricular contractions with the aid of the venous pulse tracing. Ordinary electrocardiograms as well as ordinary chest leads failed to give a clear indication of auricular contractions. We therefore tried various positions of the chest electrodes, but only an antero-posterior lead (the right arm electrode over the right sternal margin and the left arm electrode over the right scapula) yielded satisfactory records. An electrocardiogram taken with this lead is shown in figure 4. The sinus-excited P-wave is a small, blunt wave, whereas the P-wave originating in the Tawara node appears as a sharp spike at the end portion of the QRS complex. It will be noted that each nodal beat shows such a characteristic sharp spike in its QRS complex indicating simultaneous contraction of auricle and ventricle.

The clinical significance of this arrhythmia is probably slight in spite of its great theoretical interest. Old records of this patient taken in 1924 when her symptoms began, and several more recent records taken in 1932 and 1933 show on reëxamination the same characteristic arrhythmia. An arrhythmia persisting for so many years can hardly be of serious prognostic import.

SUMMARY

An unusual form of arrhythmia is described. Analysis with the aid of simultaneous electrocardiographic and venous pulse tracings shows it to consist essentially of nodal extrasystoles followed by nodal automatic beats. It is demonstrated for the first time that the ventricular portion as well as the auricular portion of the nodal extrasystole may be blocked.

REFERENCES

(1) Dressler, W.: Klinische Electrokardiographie. Berlin, Urban & Schwartzberg, 1930.

Lewis, T.: Premature Contractions Arising in Junctional Tissues. Quart J. Med., 5: 1, 1911.

Mechanism and Graphic Registration of the Heart Beats. New York, P. B. Hoeber, Inc., 1925.

Mackenzie, J.: The Extrasystole—a Contribution to the Functional Pathology of the Primitive Cardiac Tissue. Quart. J. Med. 1: 131, 1907–1908.

Pardee, H. E. B.: Clinical Aspects of the Electrocardiogram. New York, P. B. Hoeber, Inc., 1930.

(2) Lewis, T.: Paroxysmal Tachycardia Accompanied by Ventricular Form of Venous Pulse. Heart, 2: 127, 1910.

(3) Lewis, T.: Paroxysmal Tachycardia, the Result of Ectopic Impulse Formation. Heart, 1: 262, 1910.

Observations upon Disorders of the Heart's Action. Heart, 3: 279, 1912.

(4) Hewlett, A. W.: The Blocking of Auricular Extrasystoles. J. A. M. A., 48: 1597, 1907.

Rihl, J.: Supraventricular Extrasystolen mit Ausfall der nachfolgenden Kammerextrasystolen. Ztschr. f. exper. Path. u. Therap., 14: 480, 1913.

Robinson, G. C. and Draper, G.: Rhythmic Changes in the Human Heart Beat. Heart, 4: 97, 1912.

Rosenthal, L. B.: Report on a Case Demonstrating Pulsus Alternans, Blocked Auricular Extrasystoles, and Aberrant Ventricular Electric Complexes. Am. J. Med. Sc., 113: 788, 1911.

LYMPHOGRANULOMA VENEREUM

With a Report on Two Cases

MORRIS A. GOLDBERGER, M.D. and JACOB AUSLANDER, M.D.

[*Gynecological Service of Dr. Robert T. Frank*]

Lymphogranuloma venereum is a human contagious disease caused by an ultramicroscopic filterable virus, usually acquired venerally and most prevalent in warm climates. It is often referred to as the fourth venereal disease, but it is really the sixth. The other five, as pointed out by Stannus (1), are syphilis, gonorrhea, chancroid, genital infections with Vincent's bacillus, and granuloma inguinale.

Lymphogranuloma venereum is characterized by an initial lesion in the form of a minute erosion or papule, occurring on the genitalia from 6 to 30 days after exposure. The primary lesion is followed in 2 to 6 weeks by inflammation of the regional lymphatics and connective tissues. In a large percentage of women, localizations in the intrapelvic lymph glands occur. In such cases, due to gland destruction and extra-glandular infiltrations, stricture of the rectum occurs.

Lymphogranuloma venereum was considered a rare disease in the gynecological clinics of the metropolitan area of New York. Most text books on gynecology fail to mention it, in spite of its prevalence in the United States, as recently emphasized by the comprehensive reports of De Wolf and Van Cleve (2), Cole (3), and Sulzberger and Wise (4).

Patients, mostly Porto Rican and negro women, with genital ulcers and rectal strictures began to appear in our Out-Patient Department about fifteen years ago. The increase in the colored population in the district surrounding The Mount Sinai Hospital accounts for the growth in the number of cases seen in recent years. At first the disease was not recognized, and the ulcerated lesions were considered as venereal ulcers while the rectal strictures were thought to be syphilitic, tuberculous, or gonorrheal in origin.

The disease, however, has been known for centuries, as there are available descriptions dating back to the times of the Greeks, Romans, and Arabs. More recently, at about 1825 and during the following three decades, Wallace (5), Chassaignac (6) and Velpeau (7) described cases of peculiar but unidentified lymphatic masses in the groin. Scheube (8) in 1867, realizing the character of this disease, called these masses *climatic bubo*. In 1913, Nicolas, Durand, and Favre (9) described the clinical and pathological course of the disease and called it "Lymphogranulomatosis

Inguinalis Subaigue." The specific allergic skin reaction developed by Frei (10) in 1925 established the disease as a distinct clinical entity, proved its relationship to climatic bubo and provided a reliable diagnostic test.

The Frei test depends upon the sensitivity of the infected individual to the virus which acts as an antigen. The preparation of the latter consists in withdrawing pus from an infected gland of a patient suffering with lymphogranuloma venereum. The gland must be soft but not ulcerated. The pus is then mixed with physiological saline solution in the proportion of 1 part of pus to 5 to 6 parts of saline. The mixture is distributed in sterile ampules, each holding $\frac{1}{2}$ to 1 c.c. The ampules are then heated to 60 degrees for two hours over a water bath, and again the following day for one hour. The freshly heated material is then examined bacteriologically to exclude contamination. Its efficacy is tested on normal controls, since a person, though cured of the disease, may still give a positive reaction.

The test is easily carried out. The skin of the outer side of the forearm is cleansed with alcohol, and an intracutaneous injection with 0.1 c.c. Frei antigen is made. A corresponding area on the opposite arm is cleansed and injected with a similar amount of normal saline. A control case is similarly injected at the same time. The result is read 48 hours later. A positive reaction consists in the production of an infiltrated inflammatory dome-shaped area about $\frac{1}{2}$ cm. in diameter. In the center there is often a small area of necrosis with a surrounding red zone.

The use of the Frei test at The Mount Sinai Hospital has been exceedingly valuable in the diagnosis of lymphogranuloma venereum in 44 cases, 23 males and 21 females. These were reported by Dr. Kornblith (11, 12) who tested and treated most of the patients. Two of the cases from the gynecological service of The Mount Sinai Hospital are reported here.

CASE REPORTS

Case 1 (H. N. 348098). A Porto Rican woman, 26 years old, married 7 months, applied to the clinic for the relief of vaginal bleeding and dyspareunia of three weeks duration. The menses began at 14, occurred every 28 days, and lasted 3 days. She gave birth to a child four years previously and had one spontaneous abortion two months before applying to the clinic.

The general physical examination was negative. Gynecological examination disclosed an ulcerated area in the vulva at the fourchette extending into the perineum, with an induration of the posterior vaginal and anterior rectal walls. The vaginal orifice was constricted by inflammatory tissue so that a finger could not be introduced. From the posterior vaginal wall there were many fistulae which were found to extend into the rectovaginal septum (Fig. 1). They did not communicate with the rectum, nor was the rectum constricted. The Frei test was positive. The blood Wassermann test was negative.

Case 2 (H. N. 349783). A Porto Rican woman, 38 years old, com-

plained of swelling and pain in the vulva of two years duration. The menses began at the age of 15, occurred every month, and lasted four days. She was married four years to her first husband and eight years to a second. One spontaneous miscarriage occurred at six months, thirteen years ago.

The general physical examination was negative. The gynecological examination showed the clitoris to be changed into a hard, edematous structure about 6 cm. long and 1 cm. in diameter. There were numerous fistulae in the posterior and right vaginal walls leading into the paravaginal



FIG. 1. Ulcer on the fourchette extending into perineum. Rectum uninvolved

tissues. Rectal examination showed almost complete stenosis above the ampulla of the rectum. The inguinal lymph nodes were enlarged and tender (Fig. 2). The Frei test was positive. The Wassermann test was negative.

COMMENT

The two cases described above illustrate different stages of lymphogranuloma venereum. In the first, ulceration and fistula formation had

occurred but the rectal lumen had as yet not been encroached upon. The primary lesion is most often situated in the fourchette, the posterior vaginal wall, or the cervix. The lymphatic drainage is mainly towards the perianal, perirectal, sacral, and hypogastric lymph glands. The clitoris and lower third of the anterior vaginal wall drain into the inguinal glands. The abscess formation and the inflammatory reaction in and about these glands cause a blockade of the lymph vessels which results in lymph stasis



FIG. 2. Clitoris changed into an edematous structure. Many ulcers and fistulae extending into paravaginal tissues. Rectum constricted. Inguinal lymph glands enlarged.

in the vulva and rectum. This mechanism explains the edema or elephantiasis of the vulva and the rectal stricture seen in the second case. Rectal stricture is very common in the female and rare in the male because of the difference in the lymphatic drainage from the genitalia (Figs. 3 and 4) (13).

Gamna (14), in 1923, succeeded in producing lymphogranuloma venereum in guinea pigs by subcutaneous injections of pus from fluctuant buboes. The infection has also been reproduced by injecting pus from the specific lesions under the prepuce or into the brain of an animal.

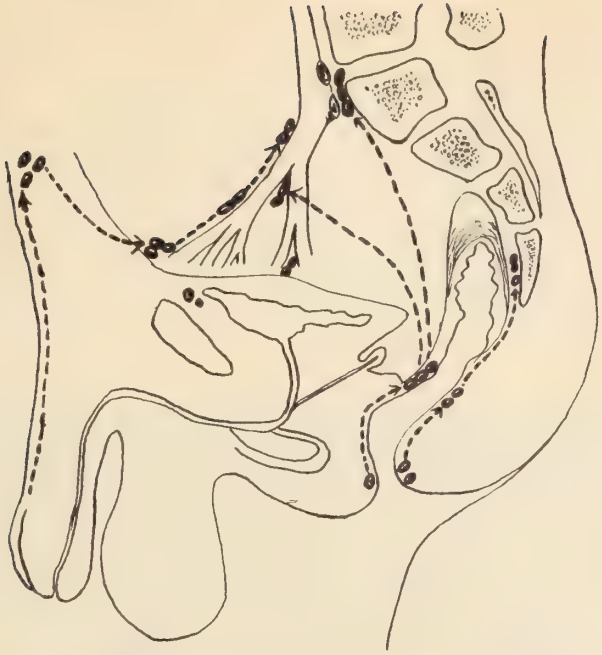


FIG. 3. Lymphatics of the male pelvis (modified from Poirier). Drainage from initial lesion usually situated on the penis involves the inguinal lymph glands. Bubo is most common in the male.

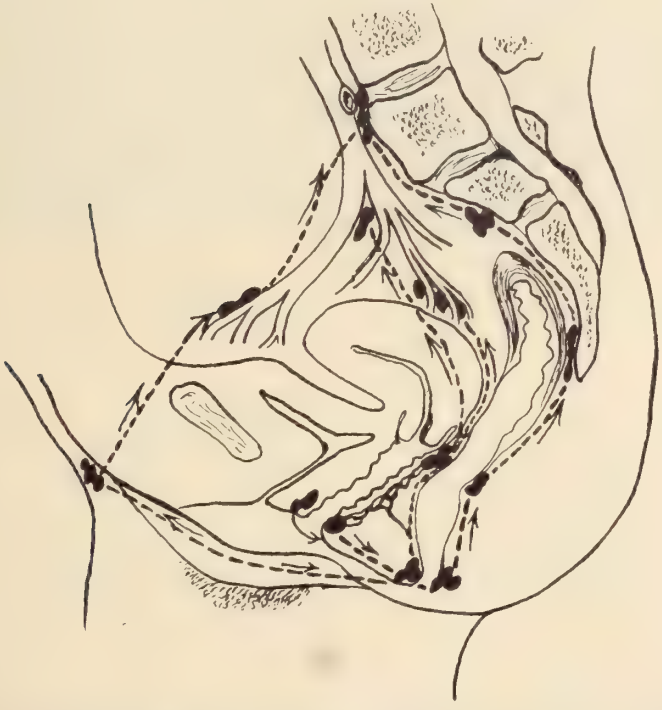


FIG. 4. Lymphatics of the female pelvis (modified from Poirier). Drainage from the initial lesion usually situated on the fourchette, the posterior vaginal wall, or the cervix involves the perianal, perirectal, sacral, and hypogastric lymph glands. Rectal stricture most common in the female.

The pathology of this disease is that of an infectious granuloma with suppuration. The lymph nodes may show varying stages of the pathological process from simple inflammation to complete necrosis. The inflammatory process usually extends into the surrounding connective tissue and fat. Histologically, the lesion shows foci of necrosis in which there are seen particles of broken down nuclei of leucocytes. These are known as Gamna bodies. The necrotic area is surrounded by a pallisaded layer of epithelioid cells, giant cells, lymphocytes, plasma cells, and fibroblasts (Fig. 5).



FIG. 5. Histologic section of an involved lymph gland. Area of necrosis containing nuclear debris (Gamna bodies). Palisade arrangement of epithelioid cells, giant cells, lymphocytes, and fibroblasts can also be seen.

DIFFERENTIAL DIAGNOSIS

Lymphogranuloma venereum is sometimes confounded with granuloma inguinale because of the similarity of the names. However, granuloma inguinale is a disease of the skin covering the groin, vulva, perineum, and buttocks. It is characterized by a soft, red, granulation tissue. It is identified by the characteristic encapsulated Donovan bodies found in smears made from the exudate of granuloma inguinale. Also the Frei test is negative.

Phagedenic chancroids of the genitals may be mistaken for lymphogranuloma venereum. Here, however, the demonstration of the *Ducrey bacilli* in the tissue and the *negative Frei test* establish the diagnosis. Also

the presence of bubo in a female should make one suspicious of chancroid.

Syphilis is often difficult to rule out as many cases of lymphogranuloma venereum have syphilis also. The dark field examinations for the spirochetae and the Wassermann tests are helpful.

Tuberculosis of the genitalia is recognized by tissue examination, guinea pig inoculations, and excluded by the Frei test.

Genital Herpes. The lesions here are superficial confluent vesicles and the Frei test is negative.

TREATMENT

The prevention of the spread of this disease is of utmost importance since the infection is believed to be acquired by direct contact. We have seen an initial lesion of lymphogranuloma venereum on the external genitalia in a child of 8 who had been given an enema with the same rectal tip the mother used. The mother was afflicted with rectal stricture and pelvic exudate due to this disease. The Frei test was positive in both mother and child. The possibility of indirect contact infection led Dr. Robert T. Frank to suggest that lymphogranuloma venereum be placed in the category of reportable venereal diseases, which is now enforced by the New York Department of Health.

Radiotherapy before suppuration, ultraviolet light, foreign protein injections, surgical measures and intravenous administration of antimony and potassium tartrate have been advised. Of these the latter is reported as giving good results.

Dr. Kornblith has been treating patients with bi-weekly injections of Frei antigen, but as yet is unwilling to report any improvement over other methods of treatment. Surgery for the relief of the rectal stricture was attempted three times at the Hospital. The operation consisted of mobilizing the rectum by dissection of the perirectal fat. In two of these cases the stricture has already recurred.

SUMMARY AND CONCLUSIONS

Two cases of lymphogranuloma venereum are presented showing different stages of the disease. The Frei test established the identity of this disease and is of great value in diagnosis. Rectal stricture occurs more often in the female because the site of the initial lesions is usually drained by the perianal, perirectal, sacral, and hypogastric lymphatic glands. The disease is transmitted by direct contact but may also be introduced by an infected intermediary object such as a douche tip, as in the case reported.

REFERENCES

(1) Stannus, H. S.: A Sixth Venereal Disease. London, Baillière, Tindall & Cox, 1933.

(2) DeWolf, H. F., and Van Cleve, J. V.: Lymphogranuloma Inguinale. J. A. M. A., 99: 1065, 1932.

(3) Cole, H. N.: Lymphogranuloma Inguinale, Fourth Venereal Disease; Its Relation to Stricture of the Rectum. J. A. M. A., 101: 1069, 1933.
(4) Sulzberger, M. B., and Wise, F.: Lymphopathia Venereum (Lymphogranulomatosis inguinalis of Nicolas, Favre and Durand). J. A. M. A., 99: 1407, 1932.
(5) Wallace, W.: A treatise on the Venereal Disease and its Varieties. London, Burgess & Hill, 1833, p. 371.
(6) Chassaignac, E.: Traitée Pratique de la Suppuration et du Drainage Chirurgical. Paris, V. Masson, 1859, p. 354.
(7) Velpeau, A.: Adenites. In Dictionnaire Encyclopédique des Sciences Medicales. Delorme and Deschambres, 1864, p. 694.
(8) Scheube, B.: Über klimatische Bubonen. Deutsch. Arch. f. klin. Med., 64: 182, 1864.
(9) Durand, M., Nicolas, J., and Favre, M.: Lymphogranuloma Inguinale. Bull. et mém. Soc. méd. d. hôp. de Par., 35: 274, 1913.
(10) Frei, W.: Ein neue Hautreaction bei Lymphogranuloma Inguinale. Klin. Wchnschr., 4: (No. 45) 2148, 1925.
(11) Kornblith, B. A.: Read at Graduate Fortnight, The Mount Sinai Hospital, October 30, 1934. Submitted for publication.
(12) Elitzak, J., and Kornblith, B. A.: Lymphogranuloma Inguinale in a Child of Eight with Rectal Symptoms. Am. J. Dis. Child., 49: 703, 1935.
(13) Poirier, P., Cueneo, B., and Delamere, G.: The Lymphatics. London, A. Constable & Co., 1913, pp. 172–173.
(14) Gamna, C.: Sulla Linfogranulomatosi Inguinale. Ricerche Cliniche ed Etiologiche. Arch. per le sc. med., 46: 31, 1923.

ADDITIONAL REFERENCES NOT INDICATED IN TEXT

Barthels, C., and Biberstein, H.: Zur Atiologie der "entzundlichen" Rektumstrikturen. Bruns, Beitrage zur Klinischen Chirurgie, 152: 161, 1931.
Elephantiasis penis et scroti und Lymphogranulomatosis Inguinalis. Ibid., 152: 325, 1931.
Bloom, D.: Strictures of the Rectum due to Lymphogranuloma Inguinale. Surg. Gynec. & Obst., 58: 827, 1934.
Burney, L. E.: Lymphogranuloma Inguinale. Ven. Dis. Inform., 15: 233, 1934.
Goldzieher, M., and Peck, S. M.: Granuloma Inguinale. Arch. f. Dermat. & Syph., 14: 14, 1926.

STRICTURE OF THE ASCENDING COLON*

SAMUEL H. KLEIN, M.D.

[*Surgical Service of Dr. Ralph Colp*]

In this case, because of the patient's age, the clinical features, laboratory and X-ray findings, a stricture of the ascending colon was diagnosed as carcinoma. However, pathological examination of the resected specimen proved it to be hyperplastic ileocaecal tuberculosis.

CASE REPORT

History (H. N. 375235). The patient, a white man, 55 years old, was admitted to the hospital complaining of acute cramp-like lower abdominal pain accompanied by copious vomiting of twenty-four hours duration. He had had a small bowel movement several hours before admission and two spontaneous movements shortly after entering the hospital, with considerable relief of symptoms. He had not noted any rise in temperature.

His family and past personal history were essentially negative. During the past three years he had had several attacks of intermittent, non-radiating, lower abdominal pain ascribed to dietary indiscretion or constipation. These attacks had occurred once or twice a year, each lasting about twenty-four hours, and vomiting occurring in one or two but never a prominent symptom. There had been no diarrhea at any time. The patient had lost three pounds in the past three months.

Examination. The patient appeared acutely ill. There was moderate tenderness on pressure in the lower abdomen, most marked in the left lower quadrant. Rectal examination was negative. The temperature was 101°F., the pulse 120 and the respirations 26 per minute. The blood pressure was 160 systolic, 110 diastolic. A blood count revealed 13,300 leucocytes per cubic millimeter, of which 80 per cent were polymorphonuclear leucocytes, 18 per cent lymphocytes and 2 per cent monocytes. The red blood cells appeared normal in the stained smear. The urine contained a strong trace of albumin and many hyaline and granular casts. The stool was positive to the guaiac test for occult blood.

X-ray examination of the abdomen with the patient in the upright position showed a moderate amount of gas in several loops of small bowel which were not distended, and a small amount of gas in the colon. There were several small fluid levels in the small bowel. On the basis of the history these findings were interpreted as indicating a partial intestinal obstruction

* Presented before the Clinical Conference of The Mount Sinai Hospital, March 22, 1935.

producing small bowel stasis. Because of the patient's age, the character of the symptoms and the X-ray findings, a provisional diagnosis of a neoplasm of the colon was made.

Course. While under observation during the next several days, he appeared to be quite comfortable. The white blood count became normal. Two more stool examinations were again positive to the guaiac test. Blood Wassermann and Kahn tests were negative.

Barium enema followed by X-ray examination of the colon revealed an irregular constricting lesion in the region of the ascending colon and hepatic flexure which again pointed to the presence of a neoplasm (Fig. 1).

X-ray examination of the chest to determine the presence or absence of pulmonary metastases disclosed that both upper lobes were studded with numerous small nodules situated in groups. They were considered to represent fibrotic and calcified tuberculous lesions. The chest was then examined by a consultant from the thoracic service. He found no abnormal physical signs and concluded that in the absence of symptoms of cough, sputum, fever and chest pain, the X-ray findings of an old tuberculous pulmonary lesion were no contraindication to operative intervention.

Six hours before operation the patient was given 80 c.c. of amfetin intraperitoneally for the purpose of local immunization. Laparotomy was then performed by Dr. Colp under spinal anesthesia. Upon opening the peritoneal cavity some free turbid fluid was found in the right lower quadrant, evidently due to the injection of amfetin. Along the medial aspect of the ascending colon in its mid-portion there was a small tumor about the size of a large walnut, which gave the impression of an ulcerating neoplasm. The liver was free of nodules and no lymph nodes were palpable. The terminal ileum was identified, divided between clamps and the ends closed aseptically. A typical side-to-side suture ileocolostomy was performed using the left portion of the transverse colon. This procedure constituted the first stage of the ileocolic resection.

The patient passed through a satisfactory convalescence and left the hospital on the twenty-eighth postoperative day. He returned to the hospital two weeks later, feeling much improved with some gain in weight and increased appetite. Bowel movements were satisfactory.

The second stage of the operation was performed by Dr. Colp three days later, again under spinal anesthesia and supplemented by gas-oxygen-ether. Innumerable adhesions were found binding the omentum to the anterior abdominal wall. The distal loop of the divided ileum was found adherent to the transverse colon; the retroperitoneal tissues about the ascending colon were densely thickened and the omentum was adherent to almost the entire length of the ascending colon. An induration could be felt about $1\frac{1}{2}$ inches above the ileocaecal junction, but it could not be determined how much of this was malignancy and how much scar tissue. After division of the many adhesions the terminal ileum, caecum, ascending colon

and transverse colon up to its midportion were mobilized and resected. The distal cut end of the colon was closed with a purse string suture and



FIG. 1. Roentgenogram taken during the barium enema showing the irregular constriction in the region of the ascending colon and hepatic flexure which suggested the presence of a neoplasm (arrow).

the retroperitoneal space closed and drained from the upper angle. The patient made an uneventful recovery.

Pathological Examination. The fat tissue about the ileocaecal junction and the portion of the ascending colon was somewhat indurated and densely adherent to these portions of the bowel. The appendix was imbedded in

dense pericolic adhesions; its lumen was obliterated. The intestine, from about 4 cm. proximal to the ileocaecal junction to about 10 cm. distal to it, corresponding to the segment to which the pericolic fat was so densely adherent, was thickened and indurated. The mucosa of the thickened ileum was finely granular and thrown up into longitudinal folds. There were two small, shallow, irregular ulcers about 5 cm. proximal to the ileocaecal valve. The mucosa of the caecal pouch was irregularly corrugated. About 5 cm. of the ascending colon just distal to the caecum was involved in a dense cicatricial process. The lumen of the middle of this segment was narrowed by a completely annular band of thick, smooth, white, scar tissue 1 cm. in length, so that even the tip of the little finger could not be passed through at this point. The remainder of this area showed irregular strands of cicatricial tissue arranged in "basket weave" pattern, and many sessile and polypoid excrescences of the mucosa which varied from pin-head size to almost 1 cm. in diameter. Several of the polyps were $1\frac{1}{2}$ cm. in length. Just above (distal to) the stricture was a shallow transverse serpiginous ulceration which measured $3\frac{1}{2}$ by 1 cm. Several small, hard lymph nodes were found in the pericolic fat tissue.

Histological studies revealed alterations characteristic of hyperplastic tuberculosis. There was advanced connective tissue proliferation in the strictured area of the ascending colon. The ulcers in the ileum and ascending colon showed acute and chronic inflammatory changes. Typical miliary tubercles were found in all the layers of the intestine (Figs. 2 and 3). Section of a regional lymph node also showed many miliary tubercles (Fig. 4). Although tubercle bacilli could not be demonstrated, the lesion was regarded to be most likely tuberculous because of the characteristic pathological picture in the intestine and the presence of tubercles in the regional lymph node.

DISCUSSION

The symptomatology of hyperplastic ileocaecal tuberculosis is by no means characteristic; hence its recognition is difficult. Herrick (1) classifies the disease into four clinical groups: those with insidious onset and slight or vague symptoms; those which simulate carcinoma; those which resemble appendicitis; and those which present the symptoms of acute ileus. In some instances, he states, the lesion resembles neoplasm very closely, as in the cases described by Kronlein, Sachs, Czerny, Pilliett and Senn, which grossly at operation or after resection could not be differentiated from new growth. Kaufmann (2) and Lockhart-Mummery (3) in their extensive reviews also observe that the condition is often diagnosed carcinoma. On the other hand, in the eight cases reported by Branch (4) the provisional diagnosis of appendicitis was made on admission to the hospital. In this connection, it is noteworthy that most of the cases of hyperplastic tuberculosis of the colon are found in the younger age groups, namely between

20 and 40 (1, 3, 4). This corresponds with the age incidence of appendicitis. Non-specific granuloma of the intestine is another condition which must be considered. Ginzburg and Oppenheimer (5) found this lesion

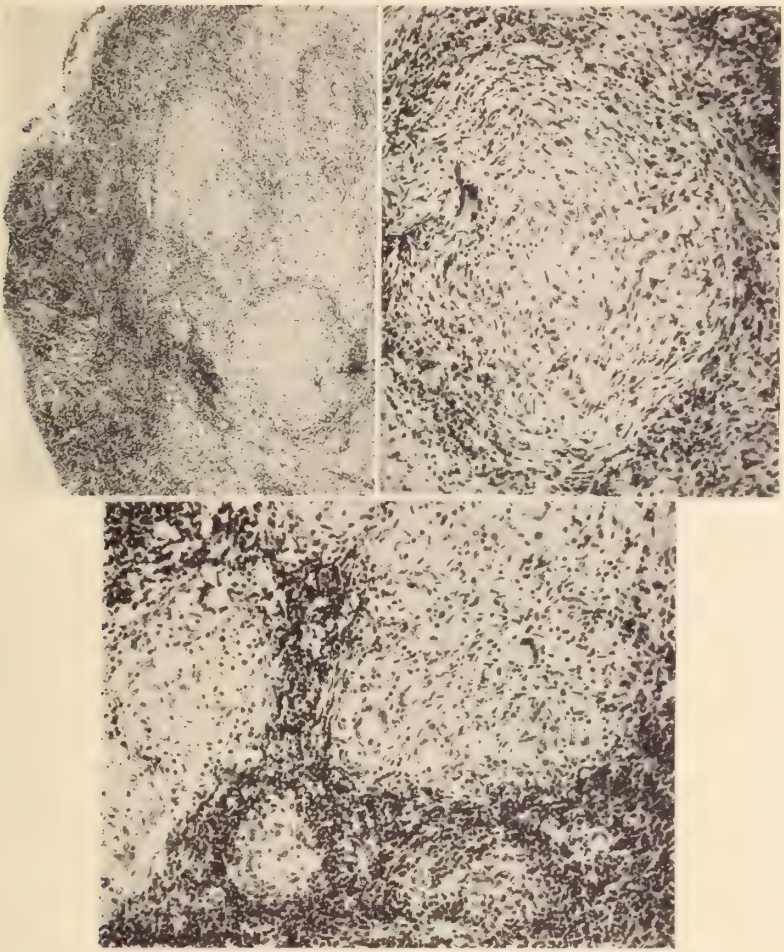


FIG. 4

FIG. 2. Microphotograph of ulcer of the ascending colon showing diffuse inflammation and miliary tubercle formation.

FIG. 3. Higher magnification of figure 2, showing typical epithelioid tubercle.

FIG. 4. Microphotograph of section from regional lymph node showing miliary tubercles.

more commonly than tuberculosis in material resected over a period of ten years at The Mount Sinai Hospital. There were only six cases of localized hypertophic ileocaecal tuberculosis removed surgically as against eighteen non-specific granulomata. In their experience a surprisingly large number

of cases diagnosed as tuberculosis clinically showed non-specific lesions on microscopic examination. Wilensky and Moschcowitz (6) came to a similar conclusion. Close scrutiny of the pathological descriptions of hyperplastic intestinal tuberculosis in the literature led them to believe that "undoubtedly many, if not a majority, of so-called hyperplastic tuberculosis of the colon are really simple granulomata."

The association of hyperplastic colonic tuberculosis with tuberculosis elsewhere in the body is said to be uncommon. In a series of 100 collected cases Lockhart-Mummery (3) found 76 with no symptoms of another tuberculous lesion. Herrick (1) reviewed 63 cases reported since 1907 and noted that only 29 of these presented evidence of tuberculosis elsewhere. Most of these other foci were in the lungs. This rather frequent occurrence of "primary" hyperplastic intestinal tuberculosis may possibly be explained by the opinions stated above that many of the diagnoses were questionable and that the lesions were really of the non-specific variety.

The X-ray diagnosis is also inconclusive. The main features seen in the barium enema examination are an irregular filling defect, obstruction, and manifestations of spasm; these findings, however, may also occur in ulcerative carcinoma of the caecum or ascending colon, chronic ulcerative colitis or non-specific granuloma (Goldfarb and Sussman (7)). Assmann (8) also states that the picture may be seen in cancer of the caecum and ascending colon and in inflammatory lesions.

The treatment should be surgical in order to rid the body of a source of digestive disturbance and a focus of infection and to relieve or prevent intestinal obstruction. The procedures advised are resection where possible or a short-circuiting operation where the lesion is too extensive or the patient is in poor condition. (Lockhart-Mummery, Herrick.) The resection may be performed in two stages consisting of an ileocolostomy followed by resection of the diseased intestinal segment. The two-stage procedure was the one followed in this case. An interesting incident was the fact that the patient refused the second operation and left the hospital against the advice of the staff; he returned only because of financial straits which caused him to be dispossessed from his home. Had he been permanently relieved of symptoms by the short-circuiting procedure as were some cases (reported by Brunner, Shiota, Souligeaux, and Wiener (9)), he might have become a case of cancer "cured" by a conservative procedure, inasmuch as the diagnosis of carcinoma was not disproven until after the specimen was removed.

REFERENCES

(1) Herrick, F. C.: Tuberculoma of the Caecum (Hyperplastic Tuberculosis). Ann. Surg., 81: 801, 1925.

(2) Kaufmann, E.: Lehrbuch der Speziellen Pathologischen Anatomie. Berlin and Leipzig, Walter de Gruyter & Co., 1922, p. 627.

(3) Lockhart-Mummery, P.: Diseases of the Rectum and Colon and Their Surgical Treatment. Baltimore, Wm. Wood & Co., 1923, p. 485.
(4) Branch, J. R. B.: Intestinal Tuberculosis causing Obstruction. Arch. Surg., 17: 440, 1928.
(5) Ginzburg, L., and Oppenheimer, G. D.: Non-specific Granulomata of the Intestines. Ann. Surg., 98: 1046, 1933.
(6) Wilensky, A. O., and Moschowitz, E.: Non-specific Granulomata of the intestine. Am. J. M. Sc., 166: 48, 1923.
(7) Goldfarb, S. J., and Sussman, M. L.: Chronic Hyperplastic Tuberculosis of the Colon. Am. J. Roentgenol. & Rad. Therapy, 25: 324, 1931.
(8) Assmann, H.: Die Klinische Röntgendiagnostik der Inneren Erkrankungen. Berlin, F. C. W. Vogel, 1934, vol. 2, p. 826.
(9) Brunner, Shiota, Souligeux, Wiener: quoted by Herrick, F. C., see reference 1.

MULTIPLE INTRACRANIAL COMPLICATIONS FOLLOWING AN APPARENTLY CURED CASE OF ACUTE MASTOIDITIS

JOSEPH G. DRUSS, M.D.

[*Otologic Service of Dr. I. Friesner*]

CASE REPORT

History (H. N. 345119). A girl, aged five years, was admitted to the hospital September 6, 1932 with a history of pain in the left ear associated with fever and chilly sensations for a period of two days. The ear began to discharge shortly after the onset of pain and continued to do so until admission.

Examination. There was a serosanguineous discharge exudating through a central perforation of the left tympanic membrane. The left mastoid was very tender. A few small tender glands were found along the left jugular vein. The right ear was normal. The temperature was elevated to 104°F.

Course. At the end of the ten days in the hospital there appeared frank signs of acute mastoiditis. A simple mastoidectomy was performed, and a considerable amount of purulent exudate was found in the mastoid cells and in some of the cells of the zygoma. All the diseased tissue was removed, and the child made an apparent recovery so that ten days after operation the patient was discharged. She remained apparently well for a period of three weeks when she suddenly began to complain of headache and vomited on two occasions. As the headache persisted, she was readmitted to the hospital.

Examination at this time showed a discharging post-auricular wound covered by unhealthy granulations. The middle ear also was discharging. There was tenderness over the zygoma. An X-ray examination revealed the presence of pneumatic cells in the zygoma. There were neck rigidity and an inconstant Babinski sign on the right side. A lumbar puncture showed cloudy cerebrospinal fluid containing 1,540 cells, of which 82 per cent were polymorphonuclear neutrophiles. There were no organisms found on smear or in culture.

No localizing signs of brain abscess could be found and a revision of the mastoidectomy wound was thought advisable. In the course of the operation necrotic areas of bone covering parts of the middle and posterior fossae were encountered, and the zygoma was found to be the seat of an extensive disease process. The exposed dura was found healthy. (There was no dural exposure at the previous operation.)

On the fourth day after the operation the child began to experience

headache and vomited repeatedly. Neck rigidity and ataxia in the left arm appeared, and the existence of a brain abscess was suspected. How-

FIG. 1

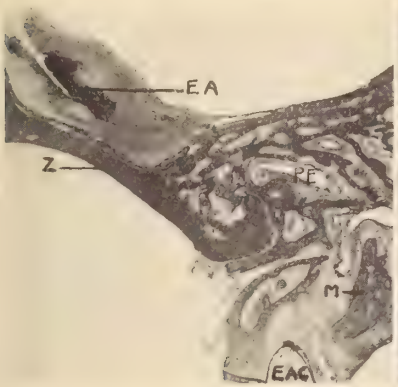




FIG. 2

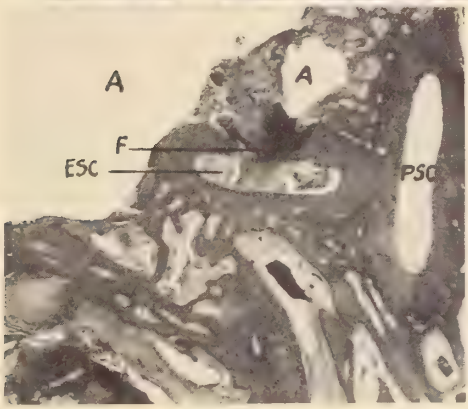


FIG. 3

FIG. 1. Photomicrograph. Section through the external auditory canal and zygoma showing a large extradural abscess of the latter. The zygoma is partially necrosed and purulent exudate is present in the adjacent pneumatic space. E. A. C., external auditory canal; M., malleus; Z., zygoma; E. A., extradural abscess; P. E., purulent exudate within adjacent cells.

FIG. 2. Photomicrograph. Section through the cochlea and petrous pyramid showing area of osteitis with new bone formation at the superior posterior margin. The infectious process has necrosed the posterior surface and an extradural abscess was produced. C., cochlea, purulent exudate within; F. N., facial nerve; I. A. M., internal auditory meatus; A., area of osteitis; D., dura, markedly inflamed.

FIG. 3. Photomicrograph. Section through the antrum showing fistula of the external semicircular canal with considerable reactive changes within and about the canal. A., antrum; E. S. C., external semicircular canal; F., fistula; P. S. C., posterior semicircular canal.

ever, an exploration for a brain abscess could not be carried out because of the grave condition of the patient. She ceased on the following day.

NECROPSY FINDINGS

Brain. An abscess was found in the left lobe of the cerebellum compressing the fourth ventricle.

Left temporal bone. On microscopic examination there was noted purulent exudate in various stages of organization in the tympanum, antrum and adjacent pneumatic spaces. It extended into the zygoma where the bone was extensively necrotic. The bony cortex of the zygoma was destroyed and the overlying dura was markedly thickened and inflamed. A large extradural collection of purulent material (epidural) was present in this region (Fig. 1). The infectious process extended medially from the tympanum and antrum along the supralabyrinthine cells into the petrous pyramid. In the region of the superior posterior margin of the petrous pyramid a large area of osteitis with abscess formation and sequestration was present (Fig. 2). The infectious process caused a necrosis of the bony cortex lining the posterior fossa with secondary involvement of the adjacent dura. This was considerably thickened and showed evidence of an extradural abscess.

A seropurulent exudate was seen in all of the whorls of the cochlea, utricle and in the semicircular canals. The endolymphatic as well as the perilymphatic spaces were involved. A large fistulous tract from the antrum through the bony labyrinthine capsule into the external semicircular canal was present (Fig. 3). The reactive changes within the external semicircular canal about the fistulous tract were of relatively longer standing than those in the remainder of the labyrinth as was evidenced by the presence of an organized tissue and new bone formation within the lumen of the canal.

COMMENT

This case demonstrates the possibility of the development of a series of complications following a thorough mastoidectomy. The routes of the extension of the infectious process in this case were as follows: The infection from the middle ear and antrum spread to (1) the bone cortex of the middle and posterior fossae; (2) the zygoma with the production of an extradural abscess; (3) the labyrinth by means of a fistula through the external semicircular canal resulting in a diffuse seropurulent labyrinthitis; (4) the petrous pyramid by way of the superior posterior paralabyrinthine group of cells with the production of a circumscribed suppurative process (abscess) at this site. The abscess eroded the bony cortex of the posterior surface of the petrous pyramid and the infectious process extended through the adjacent dura and pia arachnoid and involved the intramedullary substance of the left cerebellum with the formation of an abscess in the cerebellum.

The involvement of the zygoma was recognized only at operation, and the abscess of the cerebellum was diagnosed rather late in the clinical

course, so that operative interference would have been of no avail. The erosion of the bony cortex of the middle and posterior fossae was already noted at the second mastoid operation. The labyrinthitis and petrositis were undiagnosed clinically. It is not rare, particularly in children, to find histologic evidence of diffuse labyrinthitis in cases in which no clinical signs and symptoms were present. Disease in the petrous pyramid is also frequently found at post mortem examination though signs or symptoms were not present during the clinical course. The knowledge that an abscess in the petrous pyramid has its most frequent site at the superior posterior margin of the bone between the superior semicircular canal and the internal auditory meatus is important as an aid in the surgical approach to the petrous pyramid.

ARTHRITIS AND CATARRHAL JAUNDICE

With a Note on Their Relation to Cincophen

ROBERT V. SAGER, M.D.

[*Service of Dr. B. S. Oppenheimer*]

The following is the case of a woman who, while suffering from arthritis, developed an attack of catarrhal jaundice. Since, throughout her illness, she was under observation at The Mount Sinai Hospital and its out-patient department, it appears quite certain that she had received neither cincophen nor any of its derivatives.

CASE REPORT

History (H. N. 376118). A housewife, aged 34 years, had had five children and five abortions induced by drugs. Since giving birth to twins four years ago she had been complaining of malaise. When seen at the out-patient department, she was found to have secondary anemia. She was treated with iron and her hemoglobin rose to 85 per cent. She had had an operation for cystorectocele three years ago at which the fallopian tubes were ligated and the uterus fixed to the anterior abdominal wall. After this, menstruation ceased for two years. For years she had suffered from chronically infected paranasal sinuses. Her appetite had always been poor. She maintained herself on a diet low in meat and proteins and high in starches.

Two months before admission to the hospital, she had suffered from an attack of grippe followed by polyarthralgias without swelling of the joints but with limitation of movement. Six days before admission the pains became more severe and her temperature rose to 100.6°F. At the same time anorexia, malaise and weakness increased and there appeared mild dull epigastric pain. She was given capsules of codeine sulphate, acetyl salicylate and phenacetin at the out-patient department. A home relief physician prescribed the same drugs in solution. Three days later her urine became dark. As she did not improve, she was admitted to The Mount Sinai Hospital.

Examination. The patient weighed 90 pounds. She was undernourished and deeply icteric. Her heart and lungs were negative. The liver was large; its firm and sharp edge was felt at the level of the umbilicus; it was not tender. The spleen and the gall bladder were not palpable.

Laboratory Data. The hemoglobin was 84 per cent; white blood cells, 5,000 per cubic millimeter; polymorphonuclear cells, 53 per cent; lympho-

cytes, 36 per cent; monocytes, 11 per cent. Icteric index, 100. Van den Bergh: direct, prompt positive; indirect, 1 to 14,000 indicating 7 mg. of bilirubin per cent. There was urobilin in the stool, and bile and urobilin in the urine. The galactose tolerance test showed 8.4 gm. of galactose in the urine. There was 65 per cent retention of bromsulphthalein at 30 minutes. The blood cholesterol was 130 mg. per cent and the ester fraction was 30 mg.

Course. These tests of liver function all suggested parenchymatous liver damage, and the diagnosis of acute catarrhal jaundice (acute parenchymatous degeneration of the liver) and infectious arthritis was made. With the deepening of the jaundice the severity of the arthralgias had diminished, although they never disappeared entirely. The jaundice gradually cleared up. All the tests of liver function noted above returned to normal limits within four weeks after her admission to the hospital. A few days before her discharge from the hospital (March 2, 1935), she experienced a mild attack of tonsillitis which quickly subsided.

TABLE 1

Catarrhal jaundice with arthritis

	1929–31	1932–35	TOTAL
With cincophen	6	4	10
Without cincophen	7	13	20
Total	13	17	30

COMMENT

The recent occurrence of a number of cases of arthritis or arthralgia and catarrhal jaundice without any history of cincophen medication recalls the fact that long before the introduction of cincophen as a drug in 1908, Graves (1) followed by others had noted that a certain percentage of cases of catarrhal jaundice are associated with arthritis. Klemperer, Killian and Heyd (2) reviewed the literature on this subject.

In view of these observations a statistical study of the frequency of catarrhal jaundice with especial reference to a comparison of its incidence with and without cincophen medication was undertaken. Of 208 cases of parenchymatous liver degeneration seen since 1929 (catarrhal jaundice, hepatitis, acute and subacute yellow atrophy were the diagnoses usually made), 30 (14 per cent) had had arthritis or severe arthralgia. Of the latter 10 (33 per cent) had received cincophen or cincophen compounds, while 20 had received none.

Dividing the cases into those which occurred before the danger of so-called cincophen jaundice became widely known (approximately in the years 1931–1932) and those occurring later, it will be noted that of 13 cases

falling in the earlier period 6 (46 per cent) had taken cincophen, while of 17 cases occurring in the later period 4 (24 per cent) had taken cincophen.

These statistics, as well as the fact that catarrhal jaundice and arthritis had been described long before cincophen had been introduced, suggest that cincophen may have been accepted much too readily as the causative factor of certain cases of catarrhal jaundice. It seems quite likely that cincophen often has been given for the very arthralgias which in many instances precede the appearance of jaundice.

It is noteworthy that with the decreased use of cincophen following the cincophen jaundice scare, the frequency of arthritis and jaundice did not decrease.

Finally, Lehrman and Hanzlik (3), as a result of experimental attempts to produce hepatic injury with cincophen, concluded that there was no experimental basis for the belief that there is a direct causal relationship between cincophen medication and jaundice. A review of the previous experimental efforts of others gave them no reason to doubt their conclusion. These results should be contrasted with the fact that experimental liver damage has been evoked with accepted hepatotoxins such as chloroform, carbon tetrachloride, phosphorous, phenylhydrazine, trinitrotoluene and the arsphenamines.

CONCLUSIONS

1. A case of arthralgia and catarrhal jaundice is presented. No cincophen was taken by the patient.

2. Statistics and other evidence are brought forward which cast doubt on the assumption that there is a direct relation between cincophen and jaundice.

REFERENCES

(1) Graves: Clinical Lectures on the Practice of Medicine. Dublin, Famin & Co., 1864.

(2) Klemperer, P., Killian, J. A., and Heyd, C. G.: The Pathology of "Icterus Catarrhalis." Arch. Path., 2: 631, 1926.

(3) Lehrman, A. J., and Hanzlik, P. J.: Results of Experimental Subacute and Chronic Cincophen Poisoning. Arch. Int. Med., 52: 471, 1933.

THE PSYCHOGENIC FACTORS IN A CASE OF ANGIONEUROTIC EDEMA*

SANDOR LORAND, M.D.

[*Neurological Service of Dr. Israel Strauss*]

In the following an attempt is made to describe the psychological factors probably responsible for recurrent attacks of angioneurotic edema in a young patient. It is hoped that it will not add to the confusion already existing with regard to this subject in trying to find one more etiologic factor in this disease. An extensive literature includes as underlying factors of the disease: inherited passive anaphylaxis, toxemias of intestinal origin, food allergy, colds, neurasthenia, unstable vasomotor system, extreme irritability, and emotional instability.

Each of the above-mentioned possible causes has been supported by numerous cases; yet the complex symptomatology of the disease is still quite obscure.

CASE REPORT

History. The patient was referred by the asthma clinic to the mental health clinic in May 1932. She complained of being generally nervous and shaky, of having crying spells, of poor appetite, belching, and of being awakened and frightened by horrible dreams. She also complained of painful menstruation, lasting ten days.

She was referred to the mental health clinic, however, because of an occasional sudden swelling of her face, hands, and ankles. The swelling of the different parts of the body occurred usually during some phase of her menstrual period—either just before, or during it.

All the aforementioned difficulties started shortly after an accident. She was run over by an automobile and suffered a fractured pelvis and a cut on the left hand. This happened on July 7, 1930, nearly two years before she came to the mental health clinic. She was taken to the Lincoln Hospital where she was treated for six weeks. A month after she had come home (that is, about ten weeks after the accident), while menstruating, she became aware for the first time of the swelling on her face. Menstruation lasted ten days and was painful. Hitherto, from the age of twelve to fifteen, her periods were painless and had lasted four days. She was fifteen years old when the accident occurred.

* Delivered in the Blumenthal Auditorium, The Mount Sinai Hospital, before the New York Society of Clinical Psychiatry, April 2, 1935.

The circumstances under which this swelling of the face first occurred are of interest. It had been planned that she should go away on a vacation; but the day before she was to leave she was X-rayed, became excited, stumbled over a chair and hurt herself. Returning home she felt depressed and did not want to go away. An argument with the family resulted, during which she noticed a swelling taking place around her eyes and on her face. Only on one of the many occasions on which a similar swelling appeared did it happen while she was away from home. That one exception happened in August 1932 (three months after her admittance to the clinic as a patient), when for some technical reason she was not permitted to enter. She became irritated, cried, and then and there her face began to swell up.

Observations. Very early in the course of treatment it was detected that there was a definite connection between her symptoms and her emotional states, especially those due to the resentments and irritations which were provoked by her home environment. It was also noted that she had a great capacity for manifesting hysterical symptoms on slight provocation. In the course of treatment she developed such transient symptoms as "fainting spells" in which she never actually lost consciousness but was about to do so. She would call for her mother in whose presence the spell would rapidly disappear. At another time she developed an itch over the thighs and in the genital region; again, a numbness from the hips down with the feeling as if that part of the body did not belong to her; twice little abscesses on the genitals, one of which she herself opened with a pin because she did not want to go to the gynecological clinic for treatment; and once a slight fluor albus.

The patient was always somewhat nervous. At the age of five she had measles and chicken pox; between the ages of eight and fifteen, running ears. She was graduated from public school at fifteen, left high school the same year after the accident. In school she was rather bright. She had many friends, loved to play games, and was interested in sports.

Analytic Data. The patient was next to the youngest in the family, had one sister two years younger than herself, two brothers and an older sister. Her father left the family in 1927 and went to Russia where he is said to be living with a mistress, and, as the patient says, probably having children with her. The patient recalls that as a child she knew the father to be unfaithful to her mother, always quarreling and making scenes with her. She showed a strong attachment and love for her father in the many dreams about him and in speaking constantly about him in the course of the treatment. She even expressed the thought that it might have been her mother's fault that he left home and had to seek love from other women. Consciously she spoke about him in a depreciative manner and would display the same attitude and feeling about men in general.

The patient's mother was forty-five years old when the patient came to

the clinic and was working as a practical nurse. She was described by the patient as always being nervous and having become extremely irritable, especially since the patient's accident. The patient thought her very critical and accused her of favoritism for the younger sister. Whenever there were quarrels between the two sisters, the mother would take the sister's part. But the patient's complaint of feeling ill would cause the mother to become very attentive and to stay away from work in order to be with her. Since the accident the mother had taken the patient into her own bed. When the patient first came to the clinic she was still sleeping with her mother. The reason for this was her dreadful dreams.

The mother made strict rules about not staying out late; when later in the course of the treatment the patient began to go out with men she always had to come home early. Once when the patient came home she found the door locked and seriously contemplated leaving home because of this treatment.

She had very little in common with her two brothers and the older sister, except for arguments which usually ended in her crying. The patient, who was keeping house for the family, was constantly criticized by her brothers and sister for poor cooking, cleaning, etc. This infuriated her, but she usually expressed her feelings in tears.

The younger sister, however, played a very important rôle in the patient's neurosis. There was always jealousy and an intense rivalry between them. Before and after the accident and during the time she was attending the clinic, this jealousy and envy showed itself in open resentment. The younger sister was much taller than the patient, looked definitely older, behaved more maturely, and was also in the patient's opinion much better looking. The mere presence of this sister made the patient nervous and irritable. At times she openly accused her mother of favoring the sister.

One day in the fifth month of her attendance at the clinic she appeared with a slight swelling about her eyes. She described an argument which she had that morning with her sister. Significantly enough, she ended her narrative with the statement: "She makes also my face swollen." This swelling took place in September, 1932. In that month also her menstruation occurred for the first time in two years without pain, but she began to complain of numbness from the hips down, "as if it didn't belong to her." The swelling of her face became less frequent.

Several months later she had dreams concerning that sister, one that her sister was kidnapped, and another, that she had an accident.

At the beginning of treatment at the clinic she related that on the previous Saturday her mother had told her that on the following day they were to have a family picture taken. But that same afternoon she had an argument at home and her face became swollen and remained so throughout the next day, so that they could not go to the photographer.

While discussing with her the numbness of her thighs in relation to her

periods, it was possible to get some of her ideas and feelings about sex. Her idea about the menses was that they relieved one of rotten blood. She did not know much—or pretended not to know—about the processes of conception and pregnancy. Sexuality meant to her getting married and having babies.

She spoke frankly about her wish to be a boy. Even a year after she had left the clinic, when she considered herself completely cured, she said, "I would still give half of my life to be a man." She nevertheless soon became interested in men. She formed quite a strong attachment to a lawyer. About half a year later she began to see a druggist whom she liked and would marry "if he could make up his mind." It was while discussing men and sexual problems she developed the pruritus and several abscesses on the genitals already referred to. She denied masturbation. However, her dreams at this time clearly revealed sex trends. She was much agitated by a dream of being in the delivery room of a hospital and having a baby—"an illegitimate baby," she said. She dreamed of her father, of kissing him, and of elopements.

Treatment. The recurrent dream which caused her mother to take the patient into her bed was one in which she relived all of the stages of the accident; she saw how it happened, how she was run over, how the bystanders screamed—a dream out of which she always awoke shrieking in terror. This dream and her other complaints led me to consider her a case of traumatic neurosis. In the therapy it was essential to straighten out her objective relationships and to overcome her extremely narcissistic and infantile tendencies. Her high degree of sensitivity, her susceptibility to anxiety, her frequent changes of mood, the childish self-love, and the constant demand for love, all pointed to a strong narcissistic type. The shock caused by the injury had affected her deepest layer of self-love. For a long time she believed she would be permanently crippled.

The recurrent anxiety dreams may be regarded as a tendency to self-cure of the patient. She tried in this manner to eliminate the intolerably painful sum-total of the shock endured in the moment of the accident by refracting it in parts, redreaming it and redischarging it. Thereby she tried to restore some balance in her psyche.

The therapy in this case was mainly based on a psychoanalytical understanding of the problems which the patient had to face in her home environment and also, to an extent, of her intropsychic problems. After contact with the patient had been established, she was prompted to take up her studies again. She began to study bookkeeping. She soon became the first pupil in the class and the best at examinations. As time went on, she accepted available temporary jobs.

Her behavior at home was no longer criticized. Her younger sister was for a short while a patient at the clinic and her mother also was frequently seen and consulted, sometimes in the presence of the patient. They were impressed with the need of coöperation.

The meaning of the symptoms was explained to the patient. The reason for her present excessive demand for love was shown to her. She was encouraged to discuss her problems at home and to argue them out rather than to find refuge in crying and sulking. Under encouragement she took to her favorite sports, roller-skating and swimming.

Very soon she indulged in healthy quarrels with her brothers and sisters without the mother's interference. She became more outspoken and self-reliant. School work and attention received from men helped to restore her self-confidence. The pains and swelling disappeared as well as the constant fear of their recurrence. She once more became the active girl she was before the accident. She even made an alliance with the sister, who frequently aroused her antagonism and envy, in a revolt against the mother's strict ruling about coming home late.

At this time she decided to have a scar on her left hand removed. This was done in March 1933. As the wound did not heal rapidly, her urine was examined for sugar, and a slight trace was found. During the following year it was reëxamined repeatedly and on only three occasions did it show a slight trace of sugar. The blood sugar was negative. Throughout that time she was on a full diet.

She visited the clinic for somewhat more than a year, being seen at the beginning three times a week, later twice, then once. At the last visit she said that she felt perfectly well and was anxious to return to work.

COMMENT

According to the Freudian concept, it can be demonstrated that the structure in all neuroses is based upon three factors: The first, a special hereditary disposition; the second, an unsolved infantile conflict which interfered with the individual development and created the so-called *fixation* on some early phase of development; and third, an actual difficulty met with in life. One or another of these factors may at times be dominant and more instrumental in bringing about the illness. In this case it can be seen from the history that the two last, namely the childhood conflicts carried over into adolescence and adulthood and the traumatic experience are of greatest importance. Of course, the hereditary disposition, the constitutional element, may be regarded also as a factor in providing a fertile soil for the development of the other two.

The infantile attitude of the patient, especially concerning the father, her strong attachment to him, her identification with him ("would give half her life to be a boy") is obvious. The strong wish to remain the baby and the resentment of the mother's greater attention to the baby sister, thus usurping her place in the parents' affections in early childhood, were obviously maintained in adulthood.

The utilization of her symptoms to gain sympathy and love is as plain as their use as a self-punishment for the unconscious feelings of guilt.

These necessarily were present because of her resentment against all the members of the family, particularly the younger sister (dreams of this sister's being kidnapped or in an accident).

However, one can only speculate as to why in this case the symptom of angioneurotic edema was chosen to express psychological conflicts, aggressions, and resentments. One may also speculate about the erotization of the skin, which in this case may not be much of a mystery as she was very much concerned about her complexion and highly attentive to her face and the other parts of her body, being easily alarmed by the slightest appearance of pimples. A frequent cause of her arguments at home was that she would take a bath twice a day, morning and evening, to the inconvenience of all the other members of the family.

The slightly swollen face of the patient or her complaint of swelling or tension, which no one else could see, recall to me the mechanism of blushing, which is thought to be an expression of strong exhibitionistic, if not to say, genital tendencies. This is particularly true of this patient in whom genitality was so greatly repressed.

It should be emphasized that the structure of the several psychological mechanisms which were found responsible for the symptoms in this case is not presented here as typifying all cases of angioneurotic edema, not even a group of cases. It is found to be true in the case presented here. Its discovery made possible a therapeutic approach rewarded by apparently good results.

REFERENCES

Munger, C. W.: Angioneurotic Edema. Med. Rec., 6: 6, 1914.

Oberndorf, C. P.: Disappearance of Angioneurotic Edema after Appendectomy. J. A. M. A., 8: 24, 1912.

Turnbull, F. M.: An Etiologic Factor in Angioneurotic Edema. J. A. M. A., 9: 10, 1921.

Wiel, H. I.: Angioneurotic Edema. J. A. M. A., 4: 27, 1912.

Hermann Mond

November 2, 1891–September 17, 1935

The first knowledge that I received of Hermann Mond made a deep impression upon me. During a visit to Professor Wenckebach at his clinic in the Allgemeines Krankenhaus, in Vienna, he told me that one of his youngest associates, a Dr. Mond, was to settle in New York. He expressed his sadness at the prospect of losing him, saying that he had extraordinary ability, and adding "he is the most beloved man in my clinic."

Mond arrived here late in 1922 to assist Dr. Magida, an active practitioner in the Bronx. Dr. Magida was most kind to his protégé, but it was soon evident that Mond's great abilities should be made available to many physicians and to some large institution. After about one year Mond settled in Manhattan and began his own practice by making roentgenologic and electrocardiographic examinations for physicians. He became attached to The Mount Sinai Hospital as a volunteer. His worth was quickly recognized and his personality respected, with the result that he rapidly passed through the various grades of the service, finally becoming an Associate in Medicine. Meanwhile his private practice developed, and at the time of his death from coronary artery thrombosis, he was well on the way to become an active consulting physician.

It is not easy to describe in brief fashion the varied facets of his make-up. Moreover, it is probable that such a delineation could not be made by any one person. His medical work, especially in the fields in which he had been specially trained, was characterized by erudition, exactness and imagination. In his observations, he made no errors.

To his patients he was all kindness, and he devoted himself unreservedly to them. He was often tired, especially in the last years, but when a patient called for him, even late at night, he ignored the fatigue. He was a father-confessor to those under his care; patients voluntarily bared their souls to him. Large is the number of those whose affairs he aided to arrange and whose minds he put at rest.

He was most attentive to sick colleagues and gave freely of his own none-too-plenteous resources, or reached a group of medical associates and personal friends and together with them, aided the invalid and his family. Not a formally religious man, he was of the character of a rabbi or priest.

To his hospital work he was all devotion. He felt always that a member of a hospital staff should regard himself as a soldier in the ranks. He worked neither for position, nor for glory. In recent years he increased his hospital work very much, although he knew, from the illness that he suf-

fered several years ago, of the risk he was taking. There was no stopping him.

His publications were not numerous, but always clear, correct, and of permanent value. If we could calculate his influence on publications by others, it is sure that his output would be considered a large one.

My own feeling has always been that it was as a teacher that he was preëminent. I know of no one who could better simplify a difficult problem, or present a subject more clearly. My own debt to him in this respect is a great one. For a number of years he frequently came to my home to explain difficult papers on cardiac physiology to me. I never had a better teacher.

On the personal side, there is much that one might tell of Mond. He was interested in all the fine things of life—he lived on the heights. In music and art (particularly painting) he was a real connoisseur and critic. He aided his wife in making their home a musical center. They had open house for all. Musicians, scholars, mathematicians, physicists were happy to come, and they treated Mond as an equal. His knowledge of good literature and of philosophy was remarkable, indeed amazing. He was an artist in life, never a dilettante. In the language of his Vienna, he would be called a "Schöngeist."

He was a man of charm, of rare kindness. Nothing human was foreign to him, and he treated all human beings as equals.

The passing away of our beloved colleague brings two questions to our minds. How can we best memorialize his life, and what shall we do to obviate the condition, because of which such a man was lost to us, at so early an age?

EMANUEL LIBMAN.

CLINICAL PATHOLOGICAL CONFERENCE

Wednesday, October 9, 1935

GEORGE BAEHR, M.D., AND PAUL KLEMPERER, M.D., *presiding*

Case 1. Multiple pylephlebitic liver abscesses following appendicitis

History. The patient was a twelve year old boy whose illness began one week before admission with paraumbilical cramps, vomiting and loose stools for which he was given castor-oil and an enema without effect. During the following six days he continued to have diarrhea without abdominal pain, accompanied by numerous episodes of chills with fever rising to 105°F.

Examination. On admission the boy was acutely ill and febrile, the temperature being 103°F. There was spasticity over the right lower quadrant with tenderness and rebound tenderness. Shock tenderness was present over the liver. Rectal examination revealed fulness and tenderness on the right side. The blood count showed 21,400 white blood cells, with 90 per cent of polymorphonuclear leucocytes.

Course. On the day after admission a laparotomy was performed and an appendiceal abscess was found within which a completely gangrenous appendix was lying free. The latter was removed and the abscess was drained. The temperature continued to be swinging in type, ranging from 98.6° to 104°F. A blood culture revealed *streptococcus viridans* in three flasks. Because of the increase in the signs pointing to hepatic suppuration, the liver was aspirated and foul-smelling pus was obtained. It contained, among other organisms, streptococcus viridans. An incision was then performed for drainage of a liver abscess. The patient did poorly. The liver was again aspirated, and pus was again obtained. The wound was revised, and multiple pylephlebitic abscesses were found and drained. The patient did not improve and died two days after the second operation.

Post Mortem Findings. Autopsy disclosed an acute diffuse purulent and necrotizing thrombophlebitis of the portal vein with multiple pylephlebitic abscesses of the liver, particularly of the right lobe; also thrombophlebitis of the hepatic veins, which adequately accounts for the finding of streptococcus viridans in the general circulation. The splenic artery had become involved by contiguity and was thrombosed, leading to the formation of multiple splenic infarcts.

Case 2. Multiple pylephlebitic liver abscesses following foreign body (fish bone) perforation of the transverse colon

History. The patient was a man of sixty, who was admitted to the medical service with the complaint that for one week he had been febrile, the temperature rising to 101.5°F., and that he had anorexia and malaise.

Examination. Râles were audible at the bases of both lungs. Otherwise no significant physical signs were elicited. The patient was considered to have bronchopneumonia.

Course. During the first five days, the temperature, which on admission rose to 104°F., gradually subsided to 101°F. Then, and for the next three weeks, it assumed a spiking character ranging from 98° to 105°F., and was accompanied by daily chills. There were no other clinical manifestations. Of six blood cultures taken, one showed streptococcus viridans in one flask and another showed the organism in two flasks.

During the fourth week, there developed tenderness over the right upper quadrant and shock tenderness over the liver. A laparotomy was performed and drainage for multiple liver abscesses was instituted. A pericolonic abscess involving the right portion of the transverse colon was located at the same time. Its etiology could not be determined at operation. Cultures of the evacuated pus contained streptococcus viridans. The patient's condition grew worse and he died two days after operation.

Post Mortem Findings. At autopsy attention was promptly drawn to the transverse colon and the pericolonic abscess. The wall of the colon was markedly thickened and when opened, a localized area of the mucosa was found which was elevated, firm, reddish-gray in color, and thrown up into folds. In its center was a defect which led by two fistulous tracts into a pea-sized cavity containing purulent material. From one of these tracts a fish bone, 2.5 cm. in length and 0.5 mm. in thickness, was removed. Within the infected mass adherent to the colon, a small vein was discovered to be occluded by a yellowish-gray, friable thrombus. There were also found multiple embolic liver abscesses and thrombophlebitis of the hepatic veins, the latter accounting, as in Case 1, for the positive blood culture.

Comment. In commenting upon these two cases of liver suppuration, the finding of streptococcus viridans in the blood stream and in the pus in the liver was emphasized. It was pointed out that *Schottmueller* described a cholangitis due to streptococcus viridans (so-called cholangitis lenta) in which the organism may at times be recovered from the blood. It is apparent from these cases that the streptococcus viridans can enter the portal and even the systemic circulation from the intestinal tract and that an organism of lowest virulence may get farther up into the biliary tract or the portal and systemic circulation than the more virulent organisms of the intestinal flora.

Case 3. Purulent thrombophlebitis of the portal vein following ascending cholangitis

History. The patient was a sixty-eight year old woman, who six months previously had a cholecystostomy performed for acute cholecystitis and cholelithiasis. Following the operation she had repeated attacks of pain in the right upper quadrant, associated with elevation of temperature to about 104°F. On the night of her admission to the hospital she had such an attack of pain. Her temperature rose to 105°F.; she was nauseated, vomited, and became confused.

Examination. She was icteric. Her abdomen was spastic and a ballottable mass, believed to be the gallbladder, was palpable in the right upper quadrant. The temperature was 105°F., the pulse 110, and respirations 30. There were 20,500 white blood cells per cubic millimeter, of which 78 per cent were polymorphonuclear leucocytes. The blood pressure was 70 systolic and 30 diastolic.

Course. Though the temperature fell to normal soon after admission, her condition remained poor for a while. The blood urea was 50 mg. per 100 c.c., and the blood chlorides 630 mg. per 100 c.c. An intravenous administration of physiological saline brought about a temporary improvement in her condition. Intercurrently she developed a phlebitis of the right arm and an abscess in the right antecubital fossa which was incised and drained. The patient's condition suddenly changed for the worse. She became comatose. The coma deepened and the patient died on the twentieth day in the hospital.

Post Mortem Findings. Necropsy disclosed a chronically inflamed gallbladder containing brownish mucoid bile. The common bile duct was greatly dilated, due to an obstructing calculus (2 x 2 x 1 cm.) located just above the papilla of Vater. The biliary passages within the liver were also dilated and showed evidence of acute and chronic inflammation. The main stem of the portal vein and the terminal portions of the splenic and superior mesenteric veins were completely occluded by friable, adherent thrombus, the center of which contained fluid pus. Similar throm-

bosis was noted in the gastric and peripancreatic veins. In addition there was present generalized arteriosclerosis with early renal involvement.

Comment. In commenting upon this case, it was pointed out that operations should not be delayed in cases of complete common bile duct obstruction. Even if a carcinoma rather than a stone is found, the jaundice can be relieved by a cholecystgastrostomy and the patient's life prolonged in relative comfort. Long delay will result in irreparable damage to the liver and postoperative death from hemorrhage or cholemia. But even brief delay may result in an infection of the stagnant bile. In most cases of infection of the bile ducts or of the urinary passages, there is a predisposing mechanical cause such as a stone or an obstructing neoplasm. The biliary and the urinary tracts are the normal paths of excretion for bacteria and become infected only when there is stasis due to an obstruction; hence the need for prompt surgical intervention, especially when the obstruction is complete.

Case 4. Thrombotic occlusion of the inferior vena cava and tributaries, associated with chronic lipoid nephrosis

History. The patient, who was a forty-three year old male, had been in this hospital on two previous occasions. Two and a half years ago he entered the hospital with symptoms and signs of pneumonia with pleurisy on the right side.

First Admission. Several days after admission as this condition subsided, he developed edema of the right leg which extended up the back of the angle of the scapula and anteriorly up to the level of the umbilicus. It persisted in spite of various therapeutic measures, but one month later, as the patient spontaneously began to void large amounts of urine, the edema quickly disappeared. At this time the patient began to complain of pains in the arms, and it was noted that several superficial veins in both arms were tender and cord-like. The right jugular vein became similarly involved. The pain and phlebitis disappeared and the patient was discharged three months after the onset of the illness, with the diagnosis of *thrombophlebitis of the inferior vena cava and migrating phlebitis.*

He remained in fairly good health with the exception that slight but noticeable edema of the legs would appear during the day and disappear at night. At the end of fifteen months the edema of his legs had become more marked and had again begun to involve the abdominal wall. He was, therefore, readmitted to the hospital.

Second Admission. At this time the blood pressure was 120 systolic and 75 diastolic. The hemoglobin was 98 per cent. The blood count was normal. The urine showed a specific gravity of 1.038 and contained 3 plus albumin and 10 to 20 granular casts per low powered field. The blood urea was 19 mg. per 100 c.c. Total protein in the blood was estimated to be 3.3 per cent with albumin being 1.8 per cent and globulin 1.5 per cent. The cholesterol of the blood was found to be 735 mg. per 100 c.c., and the chlorides amounted to 595 mg. per 100 c.c. The basal metabolic rate was minus 21 per cent. The congo red test showed 62 per cent absorption.

He was placed on a high protein salt-free diet with fluids restricted to 1000 c.c. per day. Thyroid extract and ammonium chloride were administered. These measures proved ineffectual. The patient was then given 90 gm. of urea daily and on this therapy he continued to lose weight steadily. The blood protein rose to 6.2 per cent with albumin being 3.7 per cent and globulin 2.5 per cent. The cholesterol in the blood dropped to 400 mg. per 100 c.c. The urine continued to show 3 plus albumin. After a stay of four months, the patient showed marked improvement and was discharged. The clinical impression at this time was that the patient had *subacute glomerulonephritis in the nephrotic phase.*

Shortly after leaving the hospital, the patient noticed a persistent tendency to gain weight and to accumulate edema. He suffered from nausea and vomiting when

taking urea, which was no longer very effective, and was forced to discontinue it entirely. The edema then became extreme. He was admitted for the third time three months after his last discharge.

Third Admission. On this occasion the patient had massive anasarca, considerable ascites and fluid at both lung bases. The blood protein had fallen again to 3.7 per cent and the albumin-globulin ratio was inverted (albumin 1.6 per cent; globulin 2.1 per cent). The urine repeatedly showed 4 plus albumin with granular and hyaline casts as well as 3 to 5 red blood cells per high powered field. Urea could not be administered because of the patient's intolerance for the drug. He had recurrent attacks of erysipelas and his general condition gradually became worse. The edema increased and the erysipelas became gangrenous. The patient finally died from inanition and exhaustion two weeks after admission. He was believed to have had *subchronic glomerulonephritis in the nephrotic stage.*

Post Mortem Findings. Of significance in this case were the findings in the large veins and kidneys. The inferior vena cava was thickened and, just above the point of entrance of the renal veins, there was a slight constriction and decided puckering of this vessel. From this point downward and extending into the iliac and femoral veins there was a firm, filmy, trabeculated tissue having the appearance of cavernomatous tissue replacement of the lumen of these veins. On section, small channels separated from each other by filmy septa were noted. The renal veins, the spermatic veins, and the vein to the left adrenal were similarly involved. The mesenteric and splenic veins showed the same process to a lesser extent. The kidneys were large and their surfaces were smooth. The cut surface was pale grayish-red and showed diffuse yellow mottling. The cortex was widened and the glomeruli within it were prominent. Microscopic sections of the kidney showed marked congestion. Within the tubular epithelium and the interstitial tissue there was a considerable amount of doubly refractile lipoid. Of significance was the absence of inflammatory changes within the glomeruli. These only showed fatty deposits. Edema fluid was noted within Bowman's space. The morphological picture was consistent with the diagnosis of *lipoid nephrosis.*

Comment. In retrospect the clinical course of events can be reconstructed from the pathological findings. It seems likely that in consequence of the prolonged venous stasis in the kidneys occasioned by the venous thrombosis, there followed a persistent and prolonged albuminuria with subsequent depletion of plasma protein. This, in turn, contributed to the accumulation of fluid in the tissues and the serous cavities.

In the light of our experience in this case, it seems probable that the so-called nephrotic syndrome can be produced in adults as a result of prolonged albuminuria due to marked venous stasis. The resultant albuminuria may be of sufficient degree to alter the osmotic pressure of the blood by the constant drain upon plasma protein. It may even be possible that simple orthostatic albuminuria may occasionally give rise in this manner to hypoproteinemia, general anasarca and the clinical picture of the so-called "nephrotic syndrome."

Reported by Frederick H. King, M.D.

VOLUME II MARCH-APRIL, 1936 NUMBER 6

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

PRIMARY JUGULAR BULB THROMBOSIS

Postoperative Symptoms of Intracranial Involvement

JACOB L. MAYBAUM, M.D.

[*Otologic Service of Dr. I. Friesner*]

The following case of primary jugular thrombosis is presented not only because of the comparative rarity of such a complication of middle ear infection, but particularly because of the unusual postoperative course which pointed to probable intracranial complications.

CASE REPORT

History (H. N. 376041). The patient, a ten year old girl, was admitted to the hospital January, 1935, with the history of a discharging left ear of three weeks duration, followed by pain in that ear and severe left fronto-temporal headache for four days. Her temperature had ranged between 101° and 103°F. during that period.

The important incidents in her past history were a left mastoidectomy at the age of eight months and, since then, a recurring ear discharge every winter. At the age of nine years she was ill for a period of three to four weeks with pain and discharge from the left ear and severe headache, the temperature ranging between 101° and 105°F. There was a spontaneous recovery at that time.

Examination. There was a large central perforation of the drum and a moderately thick profuse discharge from the left ear. Hearing was slightly impaired. There was no mastoid tenderness. The right ear showed a large perforation with slight discharge. The spleen was enlarged. The rest of the examination was entirely negative. The blood count was 4,820,000 red blood cells, 10,200 white blood cells with 51 per cent polymorphonuclear neutrophiles, 43 per cent lymphocytes, 6 per cent monocytes, and 65 per cent hemoglobin. The temperature was 103°F.

Course. On the third day in the hospital her temperature rose to 104.8°F., and she complained of severe occipital and left fronto-temporal headache. A blood culture was taken. The white blood count showed an increase to 17,400 cells with 65 per cent polymorphonuclear neutro-

philes, 26 per cent lymphocytes, 9 per cent monocytes. It was reported as suggesting a chronic pyogenic infection. Two days later her temperature rose to 105.2°F., and she again complained of left-sided headache. Another blood culture was taken. The report of the first and later the second blood culture was Streptococcus Beta Hemolyticus. A diagnosis of sinus phlebitis was then made and it was decided to operate at once.

Operation. A simple mastoidectomy was done. The entire mastoid bone was found to be sclerotic, but there was no evidence of suppurative disease. The plate over the sinus wall looked thickened and dull gray. On removing the sinus plate low down near the bulb, there was a gush of frank pus. On further examination a small granuloma was seen lying upon the sinus with a pin-point perforation in it, through which pus could be expressed. The jugular vein was then exposed and found to be completely collapsed, thickened, discolored, and adherent to the vagus nerve. It was separated and ligated. The lateral sinus was exposed at the knee and posteriorly and found to be of normal color. The sigmoid sinus was then opened low down near the bulb, and frank pus was obtained. A large thrombus was found extending almost the entire length of the sigmoid sinus. This was removed. There was no bleeding from the bulb, but a considerable amount from the knee of the sinus, apparently coming from the superior petrosal sinus. A saline infusion was given during the operation, and a transfusion of 500 cc. of blood immediately afterward. Examination of the sinus wall showed acute inflammation with an organizing thrombus, but no bacteria were found.

Two days after operation the temperature rose to 105.8°F., and severe left-sided headache returned. There were no signs of meningeal irritation. A blood culture again showed Streptococcus Beta Hemolyticus.

Revision of operation. On the seventh day after operation, the wound was revised. Compression of the jugular vein at the angle of the jaw did not cause pus to appear in the mastoid cavity through the jugular bulb. There was free bleeding behind the knee and the sinus was repacked. Nine days later the iodoform plugs and packing were removed.

Subsequent course. Following operation, the temperature continued to rise, reaching as high as 106°F. at regular intervals of 36 to 48 hours. During these elevations of temperature, she would become very irritable and would complain of left-sided headache. In the intervals between temperature rises, the patient was quite comfortable. At no time were there meningeal signs. During the thirty days after operation, she maintained the above course. During that period repeated blood cultures were negative. The hemoglobin fell to 50 per cent, necessitating two transfusions. At the end of this period pathologic blurring of the discs and prepapillary edema were noted for the first time, but cleared up two weeks later.

It was felt that the cause of the spiking temperature and the headache

without any localizing signs of intracranial disease was probably a phlebitis of the tributary sinuses, i.e., the petrosal sinuses, condyloid veins, facial vein, etc. Other possibilities considered were sepsis from other foci of infection, malaria, and an abscess of the tentorium cerebelli. A policy of watchful waiting was decided upon. The temperature, which was septic in character for thirty days after the operation, returned to normal. The patient was discharged two weeks later, completely cured.

COMMENT

In the presence of a positive blood culture, especially revealing a hemolytic streptococcus, even though we are dealing with an innocuous looking ear and absence of evidence of mastoid involvement, a sepsis of otitic origin must be given first consideration. However, before surgical steps are taken, all other foci should be excluded as the primary source of infection. Highly significant is the fact that in recent years on the Otologic Service of The Mount Sinai Hospital positive blood cultures before operation were obtained in almost 100 per cent of our cases.

In the absence of definite evidence of an intracranial complication, further operative interference upon the lateral sinus is not necessarily indicated, provided the otitic focus has been thoroughly dealt with at the original operation, even though the postoperative blood cultures are positive. Irrigation of the jugular bulb, search for any metastases, and repeated blood transfusions are indicated.

Even though our patient had menacing symptoms of intracranial involvement for a long period (one month in this case) following the sinus operation, further operative intervention was not undertaken. This decision was based upon the fact that the headache, vomiting and septic temperature recurred at regular intervals of 36 to 48 hours, the patient remaining symptomatically free in the intervening hours.

Even weeks after the jugular ligation and sinus operation, changes in the ocular fundi, from blurring to papilledema of varying degree, may occur only to completely disappear in the course of time.

Phlebitis of the sinuses and veins tributary to the lateral sinus and internal jugular vein is the probable explanation for the postoperative clinical course in this case.

A CASE OF TACHYPNOEA CAUSED BY LYMPHANGITIC CARCINOSIS OF THE LUNGS

COLEMAN BERLEY RABIN, M.D.

[*Medical Service of Dr. George Baehr*]

The following report concerns a young woman who had carcinoma of the stomach with lymphangitic metastases throughout the lungs and dyspnoea as one of the predominant symptoms.

The fact that carcinomas of the stomach may give rise to widespread lymphatic metastases in the lungs has been known to pathologists for many years. That these metastases may cause severe dyspnoea was observed by the French at the beginning of this century, and a study of the pathogenesis of this symptom was made by Schmidt in 1906. Since then there has been little written concerning this subject. Wessler was the first in this hospital to call attention to the diagnostic significance of rapid shallow respirations in this connection. However, nothing is to be found in the English literature concerning this clinical observation until the recent report by Greenspan (1) of a clinical pathological study of four autopsied cases.

CASE REPORT

History (H. N. 357425). A female, twenty-seven years old, was admitted to the hospital on September 25, 1933, complaining of progressive weakness and gastric disturbances for eight months and cough with increasing shortness of breath of more recent onset. For three years the patient had noted a gradual loss of weight, and in February 1933, eight months before her admission to The Mount Sinai Hospital, she began to tire easily and to experience increasing weakness. In April of that year she began to suffer from gnawing epigastric pain which was relieved by ingestion of food and the administration of alkalies. Two months later she passed a large tarry stool and vomited a glassful of bright red fluid blood. She was admitted to a local hospital where she was transfused and placed upon a bland diet, following which the gastric symptoms were alleviated. After her discharge from the hospital she noted a progressively increasing dyspnoea. At first this occurred only at night at which time she required two pillows, but since then the dyspnoea became much more severe and her breathing became rapid and labored on the slightest exertion. Shortly before her admission to the hospital there appeared a dry hacking cough, and the gnawing epigastric pain recurred.

Physical examination. The patient was slightly dyspnoeic and cyanotic

and showed evidence of loss of weight. There was a dry hacking cough. She appeared fairly comfortable when at rest, but on moderate exertion such as talking for a short time, raising herself in bed or taking a few steps, the cyanosis increased, the neck veins protruded, and her breathing



Roentgenogram of chest together with stomach outlined by barium. The lungs show a diffuse clouding caused by the very fine carcinomatous infiltrations involving the pulmonary lymphatics. At both lung roots there are enlarged lymph nodes which represent metastatic lesions. Arrows point to a filling defect of the fundus and antrum along the greater and lesser curvatures, which is due to a large scirrhous carcinoma.

became more labored, the respirations being extremely rapid and shallow. There were numerous crepitant and subcrepitant râles at the bases of both lungs. The heart showed only an accentuation of the second pulmonic sound. The epigastric region was somewhat tender. There was no

apparent enlargement of the liver and no edema of the extremities or clubbing of the fingers and toes.

Laboratory findings. Roentgen examination of the chest (see accompanying figure) showed a cloudiness of both lungs from the apex to the base, caused by numerous linear and pinpoint infiltrations presenting the appearance of either miliary tuberculosis or lymphangitic carcinosis. There were large lymph nodes at the roots of both lungs.

Blood examination: Red blood cells, 4,000,000 per cu. mm.; hemoglobin, 75 per cent; color index, 0.95. There was a considerable degree of anisocytosis, poikilocytosis, central achromia and polychromatophilia. The white blood cells numbered 5,700 of which 70 per cent were polymorphonuclear neutrophiles; of these 64 per cent were segmented and 6 per cent immature forms. There were 22 per cent lymphocytes, 4 per cent mononuclear cells and 4 per cent eosinophiles.

Gastric extraction one hour after a test meal showed mucoid fluid, with no free hydrochloric acid and a total hydrochloric acid of 30. The stool gave a three-plus positive guaiac reaction on two occasions.

The *circulation time* was $11\frac{1}{2}$ seconds, and the venous pressure was equal to 8 cm. of water. Upon compression of the liver this pressure rose to 8.5 cm. The sedimentation time was 1 hour and 12 minutes.

Course. In the course of three weeks in the hospital the patient became progressively weaker and more tachypnoeic. Even when at rest the respirations numbered 32 to 40 per minute while the pulse rate was 112 to 120, and she was unable to perform the slightest movements without serious respiratory embarrassment. In spite of the severe dyspnoea which was the dominant symptom, the only other sign significant of circulatory difficulty was the accentuated pulmonic sound. The circulation time was normal and there was no elevation of venous pressure. Cyanosis, although present, was slight in comparison to the rapidity of the respirations.

Fluoroscopic examination of the chest showed a general cloudiness of both pulmonary fields in which no details could be discerned. The mediastinal shadow was widened, and the posterior mediastinum was obscured by large lymph nodes. *A significant finding at this examination was a general marked limitation of the movements of the diaphragm and of the chest during respiration.*

The rapid shallow respirations in a patient with gastric symptoms immediately suggested the diagnosis of lymphangitic metastases throughout the lungs from a primary gastric carcinoma. The absence of congestive failure, cardiac enlargement or evidence of valvular disease excluded heart disease as the cause of the dyspnoea. Furthermore, the absence of fever eliminated the diagnosis of miliary tuberculosis. The roentgenograms of the stomach showed a large filling defect in the region of the antrum and fundus of that organ, and established the diagnosis of malignancy of the stomach with metastases throughout the lungs.

Ten days after admission to the hospital the patient was allowed to return home at her own request, where she died a few days later. Permission for a post mortem examination was not obtained.

COMMENT

Although a definite differential diagnosis between lymphangitic carcinosis and miliary tuberculosis could not be made from the roentgen films of the chest, the afebrile course and the gastric symptoms made the diagnosis quite clear. Of particular interest were the extreme rapidity and shallowness of the respirations.

The tachypnoea was explained by the older observers on the basis of the closure of the small pulmonary vessels by the invading carcinoma. The pathological observations of Schmidt and of Greenspan have shown the blood vessels in the lungs invaded by carcinoma cells from the perivascular lymphatics. The vessels are narrowed to a considerable degree by the neoplastic cells and in many places are completely occluded by an endovascular proliferation of connective tissue and by secondary thromboses. These serve effectively to interfere with the circulation of the blood through the lungs and thus cause an accentuation of the second pulmonic sound. In some cases there occurs an hypertrophy of the right ventricle from the increased strain on that chamber in forcing the blood through the narrowed pulmonary blood bed. The anoxemia that results from the interference with the flow of blood through the lungs is in itself sufficient to cause some dyspnoea. Nevertheless, the clinical picture of extremely rapid, shallow respirations with only moderate cyanosis and a normal circulation time is not completely explained by this mechanism. Moore and Binger (2), in investigating the problem of dyspnoea in cases of closure of pulmonary vessels, produced numerous small pulmonary emboli in animals and observed rapid shallow respirations. They concluded that the dyspnoea was not due to the narrowing of the pulmonary blood bed, and that the shallowness of the respirations might be related to changes in pulmonary elasticity.

The fluoroscopic observations in this case shed further light upon this problem. It appears that the depth of the respirations was diminished in large part by the limitation of the movements of the diaphragm and chest wall. Since there was no inherent defect in these structures, the limitation in their movement must be attributed to an inability of the lungs to expand to their normal extent.

A striking feature of the post mortem appearance of lungs affected by lymphangitic carcinosis is the presence of crisscrossing strands of carcinoma tissue in the lymphatic channels throughout the lungs. This network of inelastic carcinoma tissue together with the scar tissue deposited within the blood vessels prevents complete expansion of the lungs during inspiration. There thus occurs a diminution of vital capacity incident

to the lack of expansibility of the lungs when they are involved with lymphangitic carcinosis. The respirations, which become more rapid as a compensatory mechanism for the obstruction of pulmonary circulation, are further accelerated as a result of the diminished vital capacity. It is only in the terminal stages of occasional cases of lymphangitic carcinosis of the lungs that congestive heart failure takes place. Death in the majority of cases is directly due to the anoxemia, caused by a combination of diminished vital capacity and obstruction to the pulmonary circulation.

REFERENCES

(1) Greenspan, E. B.: Carcinomatous Endarteritis of Pulmonary Vessels resulting in Failure of Right Ventricle. Arch. Int. Med., 54: 625, 1934.

(2) Moore, R. L., and Binger, C. A. L.: Resistance of Flow of Blood to and from Lungs. J. Exper. Med., 45: 655, 1927.
Response to Respiratory Resistance; Comparison of Effects produced by Partial Obstruction in Inspiratory and Expiratory Phases of Respiration. J. Exper. Med., 45: 1065, 1927.

INTRATHORACIC HODGKIN'S DISEASE

E. DAVID SHERMAN, M.D.

[*Radiological Service of Dr. Leopold Jaches*]

The following two cases of intrathoracic Hodgkin's disease are reported: first, to illustrate the roentgen findings and the effect of deep roentgen therapy in a case of the rare infiltrative form of the disease, which at first did not present any of its characteristic manifestations; second, to demonstrate the roentgen picture in a more typical case of generalized Hodgkin's disease showing marked changes in the mediastinum and a pleural effusion.

CASE REPORTS

Case 1. History (H. N. 351679). A twenty-two year old stenographer was admitted to the Medical Service of the hospital (Service of Dr. George Baehr) May 3, 1933. Three months before this, she complained of a cold with coryza, cough, and fever lasting for one week. It was followed by a sensation of pressure over the left upper anterior chest.

Five weeks after her first complaint the patient developed a constant dry cough accompanied by night sweats and fever for which she visited the Out-Patient Department (April 1933). At this time roentgen examination of the chest disclosed an infiltration in the left upper lobe. Hospitalization was advised.

On admission, dullness over the left supra- and infraclavicular regions with suppressed breath sounds and whispered voice was noted. The liver was palpable one finger-breadth below the right costal margin. The spleen was not palpable, and there was no lymphadenopathy. The blood showed a hemoglobin of 76 per cent, white blood cells, 16,900, polymorphonuclear neutrophiles 78 per cent, lymphocytes 22 per cent. The blood Wassermann reaction was negative. The von Pirquet test was negative, but the Mantoux test was positive. The sputum showed no acid-fast bacilli. Bronchoscopy was negative. The temperature was slightly elevated during her stay in the hospital.

A roentgenogram of the chest (May 4, 1933) revealed an infiltration in the mesial portion of the left upper lobe extending outward from the root to the midclavicular region.

Course. It was felt that from the roentgen examination a differential diagnosis between exudative tuberculosis and Hodgkin's disease could not be made at this time. Radiotherapy was then instituted but without immediate effect. The patient was discharged from the hospital after a six weeks stay (June 18, 1933).



FIG. 1. Case 1. Roentgen film of the chest on admission showing the infiltration in the left upper lobe.



FIG. 2. Case 1. Eleven months later. The infiltration in the left upper lobe is still present. Enlarged lymph node is now visible in the right paratracheal region (compare with Fig. 1).

During the succeeding twenty months several courses of radiotherapy were given to the patient.

Seven months after discharge (January 1934) the patient developed a large hard node in the left supraclavicular region. The gland disappeared after direct application of radiotherapy.

Eight months after discharge (February 1934) a roentgenogram of the chest revealed that the infiltration in the chest had decreased to about fifty per cent of its original size.



FIG. 3. Case 1. Twenty months later. Marked extension of the infiltration with increase in density. (Partly due to atelectasis). There is also an elevation of the left leaf of the diaphragm.

Eleven months after discharge (May 1934) enlargement of the right paratracheal gland was noted with increase of the shadow which disappeared with further radiotherapy. However, further progress showed that the infiltration was increasing not only in size but also in density.

Eighteen months after discharge (December 1934) the patient developed a herpes zoster on the left side at the level of the 6th and 7th dorsal segmental areas which persisted for three weeks.

During the entire time of observation her chief complaints were paroxysmal dry cough, slight fever, and night sweats. On one occasion there was blood-streaked sputum. Radiotherapy gave temporary relief of

symptoms for about six weeks. No itching, icterus or sustained bouts of fever were observed.

Twenty months after discharge (February 1935) the patient's condition became definitely worse. Her cough was aggravated, and she complained of marked weakness and loss of ten pounds in weight. A blood examination showed hemoglobin of 66 per cent; white blood cells, 12,000; polymorphonuclear neutrophiles, 79 per cent; eosinophiles, 1 per cent; basophiles, 2 per cent; lymphocytes, 12 per cent; monocytes, 5 per cent; and plasma cells, 1 per cent. She was advised to return to the hospital.

On readmission (February 20, 1935) physical examination revealed a cherry-sized node in the right supraclavicular region without other lymphadenopathy. There was dullness over the upper portion of the left upper lobe with bronchial breathing. The spleen was not palpable. A blood examination showed: hemoglobin, 78 per cent; white blood cells, 9,150; polymorphonuclear neutrophiles, 74 per cent; lymphocytes, 20 per cent; and monocytes, 6 per cent. Roentgen examination of the chest showed an increase in the size and density of the shadow previously reported in the left upper lobe. There was noted an elevation of the left leaf of the diaphragm. Fluoroscopically the diaphragm moved freely. The temperature was elevated during her stay in the hospital. Biopsy of the gland in the right supraclavicular region was reported (Dr. Klemperer) as Hodgkin's disease.

Case 2. History (H. N. 377697). A thirty-six year old housewife was admitted to the Medical Service of the hospital (Service of Dr. B. S. Oppenheimer) on March 14, 1935. Three months before admission the patient was seized with pain in the left chest, aggravated by breathing or moving. Fever and night sweats were noted. At this time she attended another hospital where a pleural effusion was diagnosed. Aspiration on several occasions yielded clear fluid. During the last year there was a loss of twenty-nine pounds in weight. There was generalized pruritus for six months. The temperature and chest pain persisted. No abdominal soreness, skeletal pains or enlargements in groins, axilla and neck were noted.

On admission a small firm node in the left supraclavicular region was found; no other lymph nodes nor the spleen were palpable. Retromanubrial dullness was increased. There was also dullness at the left base from the angle of the scapula down, with diminished fremitus and breath sounds. A blood examination showed: hemoglobin, 62 per cent; red blood cells, 4,650,000; white blood cells, 7,400; polymorphonuclear neutrophiles, 63 per cent; lymphocytes, 11 per cent; basophiles, 2 per cent; monocytes, 18 per cent; and eosinophiles, 6 per cent.

Roentgen examination of the chest revealed a marked enlargement of the lymph nodes on the left side of the mediastinum near the root of the lung. An enlarged right paratracheal gland was present. In addition,

there was a pleural effusion occupying the lower fourth of the left pleural cavity.

Biopsy of the left supraclavicular node was reported (Dr. Klemperer) as Hodgkin's disease. Radiotherapy to the mediastinum was instituted



FIG. 4. Case 2. Note the enlarged mediastinal nodes at the left hilar region with a pleural effusion at the left base. There is also an enlarged right paratracheal gland.

COMMENT

The clinical course in Case 1 was marked by the predominance of pulmonary symptoms and signs. They antedated by ten months the discovery of an enlarged superficial lymph node, a condition which suggested the strong possibility that the disease may have been primary in the lung. On the first admission the diagnosis rested between pulmonary tuberculosis and Hodgkin's disease. The subsequent glandular enlargement, particularly of the paratracheal group, the early response of the pulmonary lesion to radiotherapy and its subsequent loss of response, strongly indicated Hodgkin's disease. The appearance of homolateral herpes zoster in the presence of a pulmonary infiltration suggested an involvement of the adjacent nerve structures, but did not aid in the identification of the character

of the lesion. The occurrence of herpes zoster is infrequent in Hodgkin's disease. Craver and Haagensen (2) reported only three cases of herpes zoster in a series of seventy-two instances of Hodgkin's disease. The downhill trend of the patient, as evidenced by the marked weakness, cough, fever, loss of weight, and the progression of the pulmonary lesion as revealed by roentgenograms, aroused the suspicion of carcinoma. But the long duration of the illness and the patient's age did not favor this diagnosis. On her second admission, however, a biopsy of the recently enlarged gland in the right supraclavicular region was reported as Hodgkin's disease. It is rather significant that the spleen was never palpable and there was no itching or fever of the Pel-Ebstein type.

In the second case the early clinical manifestations were strongly suggestive of pulmonary involvement. On the other hand the generalized pruritus, which preceded the onset of pulmonary symptoms by three months, suggested Hodgkin's disease. Symmers (3) stated that occasionally generalized pruritus may precede detection of lymph nodes by many months. The differential blood count with a polymorphonucleosis of 63 per cent, eosinophilia of 6 per cent and a monocytosis of 18 per cent, and the enlargement of the paratracheal nodes also supported this diagnosis. Only one small firm node was felt in the left supraclavicular region. Biopsy of the node disclosed Hodgkin's disease. Here again the spleen was not palpable. The temperature, however, was elevated.

DISCUSSION

According to Versé (4) pulmonary involvement occurs in about 40 per cent of all cases of Hodgkin's disease. Moolten (5) reported that of the 18 most recently autopsied cases at The Mount Sinai Hospital, pulmonary lesions were present in 9, about 50 per cent of the cases. In 10 per cent or more of the cases, there is clinical and anatomical evidence to indicate that the disease actually was initiated within the lung substance.

Wessler and Jaches (6) have classified the pulmonary lesions in Hodgkin's disease as follows:

1. Mediastinal Tumor.
2. Infiltrative Type.
3. Isolated Nodules or Metastases.
4. Discrete Nodes at the Roots of the Lungs.

The first case reported would fall into Type 2, the infiltrative type. In this form the lymphogranulomatous tissue greatly invades the neighboring lung as a malignant neoplasm. The intrapulmonary lymphoid tissue has been transformed into granuloma. This is an infrequent form of the disease, and occurred in only 4 cases out of 25 reported by Wessler and Greene (1), and in 4 cases out of 40, reported by Whitaker (9).

The second case belongs to Type 1, the mediastinal tumor type. This type is characterized by large massive shadows extending outwards from

the mediastinum into the lungs. The borders are smooth and lobulated. By themselves they have no diagnostic characteristics and cannot be distinguished from other mediastinal growths.

Longcope (10) states that in a small group of cases symptoms of mediastinal tumor make their appearance early, when the superficial glandular enlargement is insignificant or even absent. With the progressive enlargement of mediastinal nodes, all the symptoms of mediastinal tumor may appear. Pleural effusions are not uncommon and lead still further to respiratory embarrassment. This is due to the masses of glands exerting pressure on the pulmonary and azygos veins. Lemon and Doyle (11) state that pleural effusions occurred in eight of their 26 cases with mediastinal involvement. Signs of compression of the great veins are not quite so common in the mediastinal Hodgkin's disease as in thoracic aneurysm.

Wessler and Greene (1) noted the great frequency of involvement of the paratracheal nodes in Hodgkin's disease, occurring in more than 50 per cent of their cases. The great rarity of exclusive or prominent involvement of the paratracheal nodes in other conditions which may be confused with Hodgkin's disease can therefore be of value in the diagnosis of obscure cases. Both cases reported here showed roentgen evidence of paratracheal involvement. Whitaker (9) in his series of 40 cases found enlarged paratracheal nodes in 17 cases.

A rapid and marked reduction in the size of the mediastinal lymphoma in Hodgkin's disease is demonstrable usually after one or two deep X-ray treatments, especially if given early in the development of disease before much fibrosis has taken place. If there is secondary extension into the lung or if the lesion is primary in the lung and of the infiltrative type (type 2), then there is usually little response to radiotherapy. This has been the experience at this hospital. Desjardins (12), McAlpin and Golden (13), Versé (4) and others have obtained similar results with their cases.

The differential diagnosis between Hodgkin's disease of the lung, tuberculosis, and other conditions may be very difficult at times, so that the course of the disease and its reponse to radiotherapy may finally make the diagnosis.

REFERENCES

(1) Wessler, H., and Greene, G. M.: Intrathoracic Hodgkin's Disease. J. A. M. A., 74: 445, 1920.

(2) Craver, L. F., and Haagensen, C. D.: A Note on the Occurrence of Herpes Zoster in Hodgkin's Disease, Lymphosarcoma, and the Leukemias. Am. J. Cancer, 16: 502, 1932.

(3) Symmers, D.: Hodgkin's Disease. The Cyclopedia of Medicine, 6: 843, 1934.

(4) Versé, M.: Die Lymphogranulomatose der Lunge und des Brustfells, in Henke, F., and Lubarsch, O.: Handbuch der speziellen pathologischen Anatomie und Histologie. Berlin, Julius Springer, 1931, Vol. 3, p. 280.

(5) Moolten, S. E.: Hodgkin's Disease of the Lung. Am. J. Cancer, 21: 253, 1934.

(6) Wessler, H., and Jaches, L.: Clinical Roentgenology of Disease of the Chest. Troy, The Southworth Company, 1923.
(7) Lenk, R.: Die Roentgendiagnostik der Intrathrokalen Tumoren und ihre Differentialdiagnose. Vienna, Julius Springer, 1929, Vol. 1, p. 196.
(8) Ceelen and Rabinowitsch: Cited by Versé (2).
(9) Whitaker, L. F.: Malignant Lymphoma (Hodgkin's Disease): a Radiographic Study. Arch. Int. Med., 32: 538, 1923.
(10) Longcope, W. J.: Hodgkin's Disease. Osler's Modern Medicine, Ed. 3, Philadelphia, Lea and Febiger, 1927, Vol. 5.
(11) Lemon, W. S., and Doyle, J. B.: Clinical Observations of Hodgkin's Disease with Special Reference to Mediastinal Involvement. Am. J. M. Sc., 162: 516, 1921.
(12) Desjardins, A. U.: Rationale of Radiotherapy in Hodgkin's Disease and Lymphosarcoma. Am. J. Roentgenol., 17: 232, 1927.
(13) McAlpin, K. R., and Golden, R.: Roentgen Treatment of Lymphoblastoma (Hodgkin's Disease). Am. J. Roentgenol., 29: 83, 1933.
(14) Hartfall, S. J.: Hodgkin's Disease of the Lung. Guy's Hosp. Rep., 82: 55, 1932.

AMOEBIC ABSCESS OF THE LIVER

WILLIAM H. MENCHER, M.D.

[*Surgical Service of Dr. Harold Neuhof*]

Contrary to the former belief, amoebiasis is no longer considered a disease limited to tropical countries. In a recent study of 49,336 cases examined in the United States, Craig (1) found 11.6 per cent infected with endamoeba histolytica. He is of the opinion that 5 to 10 per cent of the people of this country harbor the parasite.

Prior to 1933, the occurrence of amoebic dysentery in and about New York City was not reported with any degree of frequency. In November of that year an epidemic of this disease of vast proportions was reported in Chicago. From November 1933 to September 1934, 121 cases of amoebic infection were reported in New York City; 48 cases or 39.7 per cent of these could not be charged to infection acquired in Chicago. These figures seem to support McCoy's (2) contention that "there appears to be very little evidence that clinical cases originating in Chicago led to any considerable spread of the infection in the communities to which the infected individuals have gone." Reports indicate that the disease remains endemic in various sections of the country with spreads from time to time within these areas.

Amoebic abscess of the liver is a rather common complication of the disease, the amoebae being transported from the colon to the liver by way of the portal circulation and causing either a diffuse hepatitis or localized abscesses with or without secondary extension through the diaphragm. Liver infection is found frequently in individuals in whom there is no antecedent history of intestinal symptoms. In a group of 318 cases Ochsner and DeBakey (3) report 131 cases or 41.1 per cent in whom no history of diarrhea could be elicited. This finding can be accounted for by the limitation of the infection to the ascending colon. Diarrhea in amoebiasis is caused by the irritation and ulceration of the colon by the amoeba. In cases in which the lesion is limited to the descending colon, an outpouring of fluid results in frequent evacuations of watery stools. When the lesion is located, however, in the ascending colon, despite the fact that a similar exudation of fluid takes place, diarrhea does not occur because the fluid is absorbed in its passage to and through the left side of the colon. Absence of diarrhea, therefore, does not exclude a diagnosis of amoebic infection of the colon.

Prolonged pyrexia, loss of weight, enlarged or tender liver, elevation of the diaphragm are quite characteristic clinical signs, but the discovery of

the parasite is essential for a diagnosis. However, stools may be consistently negative and aspirated pus or scrapings from abscess walls may fail to reveal the amoebae. It is important that in cases where careful search fails to reveal the amoeba that biopsies be taken deeply in the wall of the abscess. Examination of a section of the wall of an amoebic abscess will disclose a gradual transition from normal tissue to the completely necrotic area on the surface of the abscess wall. The amoebae will be found to be most numerous in what may be called the intermediate zone in which no ulceration or desquamation exists.

The treatment of the abscess is both surgical and medical, and consists of evacuation either by open operation or by aspiration and the administration of emetine with or without the arsenicals.

The following case of amoebic abscess of the liver is presented to emphasize many of the points touched upon in the previous paragraphs, and also to illustrate anew the prompt effect of the specific drug.

CASE REPORT

History (H. N. 375425). A white woman, aged 35 years, was apparently well until sixteen weeks previous to her admission to the hospital, when following the ingestion of some fish she began to experience repeated attacks of nausea and vomiting associated with abdominal cramps in the right lower quadrant of the abdomen and in the right flank at the level of the umbilicus. The pain was steady and usually followed the nausea and vomiting. There was no preceding peri-umbilical distress. The pain remained localized for five weeks and then shifted towards the umbilical region. Nausea and vomiting continued as often as two or three times daily. The vomitus consisted of greenish or greenish brown material, never bloody or black. The bowels were constipated and required catharsis. Stools were never diarrheal, bloody, tarry, or clay colored. The pain did not seem to be related to either eating or bowel movement.

Five weeks prior to admission the pain disappeared but the nausea and vomiting persisted. Since the onset of the illness, there was constant anorexia, and weakness was progressively more marked. There were no fever, chills or sweats. Soreness and dryness of the tongue were noted two weeks before admission. The patient was confined to bed for sixteen weeks, losing 33 pounds during that period. She was seen by a physician for the first time the day before admission. He found her in a grave physical condition and urged her prompt transfer to a hospital.

Examination. On admission to the hospital she was found to be extremely emaciated, pale and weak. Her temperature was 101.6°F. Her weight was 90 pounds. The right side of the abdomen was occupied by a smooth, non-tender mass filling the whole of the right upper quadrant. The percussion note over the right chest from the angle of the scapula down to the base ranged from dullness to flatness with diminished to absent breath sounds and fremitus.

The blood pressure was 110 systolic and 70 diastolic. Blood examination revealed: hemoglobin, 37 per cent; red blood corpuscles, 2,340,000; platelets, 250,000; white blood corpuscles, 10,150; polymorphonuclear leucocytes, segmented, 68 per cent; non-segmented, 17 per cent; lymphocytes, 10 per cent; monocytes, 5 per cent. Bleeding time was 2 minutes, clotting time 4½ minutes; clot retraction was poor in 6 hours. Examination of the stool for blood was positive on each examination.

X-ray examination of the chest showed a "sharply demarcated effusion occupying the lower half of the right chest. The effusion is situated in part underneath the lung." X-ray examination of the gastro-intestinal tract showed no abnormality. Diagnostic right chest aspiration in the 8th intercostal space in the angle of the scapula withdrew 20 cc. of clear straw-colored fluid. Chest aspiration in the 9th space yielded greenish, non-odorous pus, smear of which showed no organisms. A similar aspiration from the 10th interspace the following day showed degenerated pus cells and gram positive cocci. Another examination of the stool was still positive for blood and negative for amoebae.

Course. The temperature varied between normal and 102°F. The surgical service was called into consultation at this time. It was felt by some that the clinical picture could be due to appendicitis with secondary liver or subphrenic infection (although the patient stated the appendix was removed at a previous operation 15 years ago). It was also thought that the differences in the character of the aspirated fluid in the 8th, 9th, and 10th intercostal spaces respectively, from clear fluid to pus without organisms to pus with organisms of the coccus group favored the diagnosis of a large empyema.

Operation. Exploratory excision of a portion of the 10th rib in the right axillary line. A marked bulging was noted in the underlying tissue. A needle was inserted through this bulge, and pus was at once encountered. A huge cavity was entered which was filled with thick greenish pus. The capacity was over 2½ quarts. After the contents were evacuated thoroughly, it was noted that there was a leakage of bile from several tiny sinuses in the lower end of the cavity, the limits of which were as follows: above was the diaphragm, externally was the lowermost chest wall while the lowermost part seemed to overlap the right kidney, which could be balloted with one hand in the cavity and the other hand in the loin. The cavity was packed with gauze.

On the second postoperative day there was profuse biliary discharge which cleared up within the next day or two. Profuse drainage of sanguino-purulent material, however, continued for days. Constant suction drainage was necessary to empty the abscess cavity adequately. The temperature continued to fluctuate and the patient showed but slight improvement. Several transfusions were given to combat the marked anemia. The abscess cavity showed no tendency to diminish in size or in the amount of drainage.

Despite the fact that examination of pus and scrapings of the walls of the cavity were negative for amoebae on several examinations, an amoebic abscess was suspected, and on the eleventh postoperative day several deep biopsies were taken from the abscess walls and were soon reported to be positive for amoebae.

Emetine and carbasone were then administered with prompt and specific response. The cavity began to discharge less pus and its size diminished rapidly. The fever subsided; the patient felt better, and began to gain weight. She was discharged on the forty-seventh postoperative day with a small cavity holding only two ounces.

She was last seen in October 1935. There was a gain of 14 pounds in weight. The patient was free of symptoms, and her wound was completely healed.

COMMENT

A case of liver abscess is presented in which the diagnosis of amoebic infection was not made until a deep biopsy obtained after operation revealed the amoebae. The picture was confused by the finding of fluid and pus with organisms of the coccus group during chest aspiration. The profuse drainage from the wound ceased promptly after the administration of emetine, and the patient made a speedy recovery with complete and rapid healing of the wound.

The diagnosis of hepatic abscess due to amoebae can only be made with certainty upon the discovery of the parasite. Stools, pus, and superficial scrapings of the abscess wall may fail to reveal the amoebae. Therefore, biopsies should be taken deeply in the walls of abscess cavities.

REFERENCES

(1) Craig, C. F.: The Amoebiasis Problem. J. A. M. A., 98: 1616, 1932.
(2) McCoy, G. W.: Control of Amoebic Dysentery. Pub. Health Rep., 49: 360, 1934.
(3) Ochsner, A., and DeBakey, M.: Diagnosis and Treatment of Amoebic Abscess of the Liver. Am. J. Digest. Dis. & Nutrition, 2: 47, 1935.

HIATUS HERNIA

ELI MOSCHCOWITZ, M.D.

[*Service of Dr. B. S. Oppenheimer*]

Anginal syndrome is not always the result of coronary disease. One of the conditions that may simulate this syndrome is *hiatus hernia*. Apparently hiatus hernia is a fairly common condition, and the determination of such a lesion in a doubtful case of angina pectoris alters the prognosis profoundly.

CASE REPORT

History (H. N. 374417). A 50 year old Russian housewife was admitted to the hospital because of "heart disease," which dated back to the age of 26. The patient was always extremely obese, weighing as much as 210 pounds at the age of 26. She remembers that the pain was relieved by amyl nitrite inhalations. She had these attacks about once every two to three years, and shortly after the first attack she developed hypertension. An attack was characterized by severe precordial pain and a sensation of tightness across the chest. The patient would become cold and clammy and would have to lie down. The blood pressure would rise during an attack. The patient felt completely well and would resume her normal activities within 24 hours of the attack. She never had dyspnea on exertion, edema, or other signs of cardiac distress.

About five years ago the patient had one of those attacks following a long trip. It was diagnosed as an acute coronary thrombosis. She had severe precordial pain, perspired considerably, and her blood pressure dropped at that time to about 120 systolic and 80 diastolic. However, it quickly rose within a few weeks to its former high level of 210 systolic and 100 diastolic. At this time the patient began to consider herself a chronic invalid and for six months had never left her home. The attacks were often caused by emotional distress. Any family argument would precipitate precordial pain, and she would fall into a state of semi-consciousness, remain in bed for a day, resuming activities at the earliest possible moment. It seemed strange that between "pains" she was perfectly well. However, she would have minor attacks, which she described as faintness, during which she was dizzy and her toes felt numb. These attacks would last a few minutes.

After the major attack of five years ago, she was advised to reduce. Diet and administration of thyroid extract caused the loss of 60 pounds in the course of two years. She was then seen in the Consultation Clinic

of this hospital where, after a thorough study, she was thought to be gravely ill. She was treated by her family as an invalid, and the mildest attack of pain would alarm the family.

In May 1934, while attending a lecture in an overheated room, she suddenly fainted and when seen by a physician about a half hour later, she appeared exceedingly pale and extremely weak. At this time the blood pressure was 160 systolic and 90 diastolic. A coronary closure was suspected, and she was brought to the hospital.

Examination. There was slight enlargement of the heart to the left. The blood pressure was 186 systolic and 120 diastolic. The fundi showed slight narrowing of the vessels. Otherwise the physical examination was negative.

Course. The following day the blood pressure dropped to 130 systolic and 105 diastolic, and shortly after the diastolic pressure fell to 90. The urinary concentration was good. X-ray examination revealed hypertrophy and slight dilatation of the left ventricle. An electrocardiogram showed left ventricular preponderance, P-wave diphasic in lead III, T-wave inverted in lead III, of low amplitude in leads II and IV, Q-4 high. Ten days later the blood pressure had again risen to 150 systolic and 100 diastolic. She returned home.

Soon after she had another attack of precordial pain with radiation to both arms and accompanied by dizziness. She became weak and very apprehensive, and was unable to perform her ordinary toilette without becoming fatigued. Her feet and hands became cold. There was precordial pain on the slightest exertion. She was readmitted to the hospital. In addition to the previous findings there was now a systolic murmur at the apex. The blood pressure on admission was 150 systolic and 100 diastolic, then fell to 120 systolic and 88 diastolic, where it remained throughout the patient's stay in the hospital. The saccharin time was $13\frac{3}{4}$ seconds. The vital capacity was 62 per cent of the normal; on repetition it rose to 87 per cent of normal. On two occasions while in the hospital the patient had severe precordial oppression; she trembled from nervousness; the pulse was of good quality and not rapid. The heart sounds were of good quality; the blood pressure was 150 systolic and 100 diastolic; the patient was extremely weak and occasionally had sighing respiration; the temperature was normal. With each spell the patient had nausea and vomiting. Although the precordial oppression completely disappeared, the patient felt prostrated and cold.

It seemed rather strange that a coronary disease should begin at the age of 26 and that at the end of 24 years there was little or no evidence of impairment of heart function. For this reason it was suggested that she might be suffering from a para-esophageal hernia. Such proved to be the case (see accompanying figure). Questioned more closely, the patient described the pain as being precordial, radiating to the scapular region

and left arm, and occasionally to the right; sometimes the pain travelled across the lower part of the chest and was accompanied by a numb sensation in the legs. The pain subsided spontaneously or with sedatives, and sometimes by belching. She felt that sodium bicarbonate would relieve the pain. Occasionally there were nausea and vomiting of small quantities of food. The electrocardiagram on the second admission



Arrow points to portion of cardia above diaphragm herniated through esophageal opening

showed R-T transition slightly depressed in leads I and II, T-waves low and diphasic in the standard leads. Later the T-1 became upright.

The moment the patient was told there was nothing wrong with her heart she had no further major attacks, and although she still has mild precordial pain occasionally, and sometimes nausea and vomiting after meals, she no longer reacts as strongly as in the past. Her blood pressure

is still low, 120 systolic and 80 diastolic. The patient is able to carry on without any distress, and she remains a very active woman.

COMMENT

The credit for calling attention to the clinical importance of paraesophageal or hiatus hernia belongs to von Bergman (1). He finds such a hernia with extraordinary frequency; for instance, one of his pupils, Berg (2), reports no less than 60 cases observed in the course of a few years. To determine such a hernia roentgenologically requires a painstaking technique (Knothe (3)). Symptomatically, hiatus hernia simulates angina pectoris closely. There is substernal or epigastric pain, sometimes in the median line or beneath the left ribs, with radiation to the back or even down the arm as in true coronary disease. Gastric symptoms are frequent: belching, hiccups, heartburn, rumination, aerophagia, rarely hematemesis. The latter, according to von Bergman, results from strangulation. The coronary symptoms are explained by the pressure of the hernial contents upon the vagus nerves which pass through the esophageal opening. Indeed, Dietrich and Schweigh (4) found experimentally that distension of a balloon in the esophageal opening produces a diminished coronary flow in the dog.

REFERENCES

(1) von Bergmann, G.: Das epiphrenale Symptom, seine Beziehung zur Angina Pectoris. Deutsch. med. Wchnschr., 58: 605, 1932.

(2) Berg, H. H.: Über das klinische und röntgenologische Bild der Hiatusbrüche und des Divertikel des Magendarmkanals. Verh. Gesell f. Verdauungs- u. Stoffwechselkr., 10th edition, 1930, p. 67.

(3) Knothe, W.: Die Hiatushernien von Standpunkt des Röntgenologen. Deutsch. med. Wchnschr., 58: 609, 1932.

(4) Dietrich and Schweigh: Quoted by von Bergmann (1).

RECURRENT CEREBELLAR ABSCESS OF NINE YEARS DURATION

NORMAN REIDER, M.D.

[*Neurological Service of Dr. Israel Strauss and Neurosurgical Service of Dr. Ira Cohen*]

Occasionally the recovery of a brain abscess is interrupted by the appearance of a new suppurative focus in the proximity of the original abscess. A revision of the operative site discloses the new pocket of pus. Such occurrences usually take place soon after the first operation. For a patient to remain well for a period of years before such a recurrence ensues is quite uncommon. The following case demonstrates, however, that an abscess may remain dormant over a period of many years before it is awakened to new activity.

CASE REPORT

History (H.N. 372203). The patient, a 39 year old housewife, was admitted to the hospital on October 16, 1934. She had been well until the Spring of 1925 when she developed a discharging right ear. In a few days she began to complain of headache; fever, nausea, vomiting, double vision and confusion followed. She was then taken to the Lakeside Hospital, Cleveland. There the positive findings included marked stiffness of the neck, narrowed right palpebral fissure, marked bilateral choked discs, nystagmus in both directions and localized tenderness over the right "cerebellar" region. The cerebrospinal fluid contained 100 cells, the majority of which were lymphocytes. Operation revealed a small abscess in the right cerebellar lobe adherent to the dura. Cultures of the pus showed *Staphylococcus aureus*. The abscess was drained, and the patient recovered and went home apparently well.

About three years later (February 1928) she reëntered the Lakeside Hospital. She experienced a sudden return of headaches, nausea and vomiting. Examination at this time revealed some tenderness over the occipital region, slight haziness of the optic nerve heads and slight ataxia of the right arm and leg. The cerebrospinal fluid contained 400 cells. She was explored and a recurrent abscess was found. This was opened and drained. At this time a culture of the pus obtained from the abscess showed *Staphylococcus albus*.

For the subsequent six years she remained well except for the frequent occurrence of mild headaches, especially in the presence of head colds. Then nine hours before admission, she suddenly became ill with a severe headache, fever, nausea, vomiting; and, according to those who saw her,

she appeared to lose consciousness, but she herself said that she was not unconscious. Four hours later lumbar puncture at another hospital yielded cloudy fluid. She was then brought to The Mount Sinai Hospital.

Examination. The patient was conscious, oriented, and coöperative. She complained of severe headache. There was a tender, bulging, subocciptal craniotomy defect. A few palpable tender posterior cervical lymph nodes were present. The right ear was normal; the left showed slight reddening and fullness of the drum. A neurological status included the following: a stiff neck, bilateral Kernig sign, bilateral Babinski sign, intact motor power. There were no sensory or cerebellar disturbances. There was bilateral secondary optic atrophy.

A lumbar puncture yielded cloudy cerebrospinal fluid under 250 mm. of water pressure. It contained 2600 cells, 82 per cent polymorphonuclear neutrophiles. No organisms were present on smear or culture.

Course. A recurrence of the brain abscess was suspected, and on the second day after admission, an incision into the cerebellar scar tissue was made. On aspiration 4 cc. of pus were obtained at a depth of 5 cm. In the course of an attempt to get a better exposure, the needle was dislodged and the abscess could not be found again. It was then felt that the abscess was small and was probably emptied by the initial aspiration. No osteomyelitic process of the bone surrounding the defect was noted. Culture of the pus yielded *Staphylococcus albus.* The wound was sutured loosely.

For a while the patient ran a low-grade febrile course. The meningeal signs and Babinski disappeared. The purulent discharge from the wound slowly subsided. The wound healed, and the patient was discharged on November 8, 1934. From the third postoperative day, there were noted slight cerebellar signs: nystagmus on right lateral gaze, slight finger to nose ataxia with the right hand, and bilateral dysdiadochocinesis.

When seen on June 2, 1935, the patient reported that she was free of complaints and that she was doing her housework. She noticed only an occasional slight discharge from a small sinus at the operative site.

COMMENT

The tendency of brain abscesses to undergo spontaneous healing has been stressed by Globus and Horn (1). Yet in this instance a period of nine years of freedom from signs and symptoms of an intracranial lesion was interrupted twice at long intervals by the reappearance of manifestations pointing to the recurrence of a suppurative process in the right cerebellar hemisphere. Each time the lesion was verified by operative interference and found in the proximity of the original brain abscess. Studies of post mortem material of recurrent brain abscesses indicate that the period of time elapsed in this case would suffice to bring about complete obliteration of the abscess. For this reason it is necessary to consider the probable existence of an infecting focus, capable of discharging along established

routes an infectious agent, the latter finding its way into the cerebellar tissue in the neighborhood of the primary abscess. This is in accord with the views recently expressed by Cohen (2), who emphasizes the frequency with which osteomyelitic foci are found in this type of brain abscess. He reports a similar case with brain abscess secondary to osteomyelitis of the skull wherein an abscess was found at post mortem examination eleven years after the onset of the osteomyelitis. However, in the case presented here, no such focus could be found at operation. Therefore, it is difficult to rule out the possibility that a small suppurative focus in the connective tissue which had replaced the original abscess was present and clinically silent over a period of years.

Another highly unusual feature in this case was the complete absence of cerebellar signs until after the operation.

REFERENCES

(1) Globus, J. H. and Horn, W. L.: Inherent Healing Properties of Abscess of the Brain. Arch. Otolaryng., 16: 603, 1932.

(2) Cohen, Ira: Osteomyelitis of the Skull. Ann. Surg., 97: 733, 1933.

PARATHYROID HYPERPLASIA AND CALCINOSIS ASSOCIATED WITH RENAL DISEASE

HERBERT POLLACK, M.D., AND SHEPPARD SIEGAL, M.D.

[Medical Service of Dr. George Baehr]

Recent advances in our knowledge of the factors controlling the metabolism of the inorganic substances in the human body have opened a new field of clinical investigation. Through the work of Hunter (1) in England, Barr and Bulger (2) and the group at the Massachusetts General Hospital (3) in this country, the syndrome of hyperparathyroidism is now a recognized clinical entity. These investigators have emphasized that conditions such as osteitis fibrosa cystica, hypercalcinemia, hypercalcinuria, hypophosphatemia, and at times nephrolithiasis are all links in the chain resulting from overactivity of the parathyroid glands. The knowledge of the manifestations of hyperparathyroidism has been so well developed that it is now possible at times to diagnose the presence of a parathyroid adenoma, remove it surgically, restore a normal metabolism, and thus bring to a halt an otherwise progressive, crippling and often fatal disease.

Hyperparathyroidism is usually due to one or more actively functioning adenomata or to hyperplasia of the parathyroids, resulting in an increased amount of hormone in the blood and tissues. This hormone regulates the concentration of calcium in the blood, the rate of its deposition, mobilization, and excretion. Hence, an increased secretion of this hormone causes a disturbance in the metabolism of calcium as well as in the metabolism of the closely associated inorganic phosphorus.

It can be stated empirically that these two elements (calcium and phosphorus) are generally present in concentrations which are inversely related: that is, when the concentration of calcium is increased in the blood there is an associated decrease in the phosphorus concentration. The reverse is also true: when the concentration of phosphate is increased in the blood stream there is a decrease in the concentration of the calcium. In the presence of an increased production of the parathyroid hormone, however, there is an increased mobilization of calcium and phosphorus from the bones, and with adequate renal function there is also an increased urinary excretion of both.

Parathyroid adenomata are usually primary in true cases of generalized osteitis fibrosa, but hyperplasia and adenomata in these glands may also occur as secondary developments in diseases such as rickets, vitamin D deficiency and chronic nephritis.

Although the classical form of osteitis fibrosa as described by von

Recklinghausen presents itself mainly as a problem in bone disease (i.e., the excessive calcium mobilization from the bones results in osteoporosis and multiple cyst formation), others masquerade as cases of renal disease. These may take the form of calcium stones in the calyces, pelves, or ureters or by the actual deposition of calcium salts in the renal parenchyma (nephrocalcinosis).

The clinical syndrome observed in cases in which the dominant symptoms of primary hyperparathyroidism are largely renal in character is easily confused with another clinical syndrome whose final stages closely resemble it. This is seen in the group of cases where parathyroid hyperplasia is found secondary to long standing renal insufficiency with phosphate retention. In renal insufficiency secondary to hyperparathyroidism, the blood level of phosphate increases. The retention of phosphoric acid tends to inhibit the mobilization of calcium phosphate from the bones. It therefore tends to neutralize the effect of the excessive parathyroid hormone. In hyperparathyroidism and renal insufficiency, the calcium level of the blood may drop as the phosphate level rises until even normal figures for the concentration of both may be reached before the patient dies in uremia, thus masking the presence of hyperparathyroidism.

The possibility that renal insufficiency may be the causative factor for parathyroid hyperplasia must also be considered. The increased concentration of phosphate ions in the blood, due to its diminished excretion in nephritis, causes a subnormal concentration of the calcium ions in the blood stream. The parathyroid glands may compensate for the drop in blood calcium and maintain a normal serum calcium concentration by releasing more of its hormone. Albright, Baird, Cope, and Bloomberg (4) also raise the question as to whether the parathyroid enlargement may not be secondary to the renal disease by saying: "It seems conceivable that a chronic renal insufficiency with phosphate retention and a high serum inorganic phosphate level might likewise cause hyperplasia of all parathyroid tissue."

Pappenheimer and Wilens (5) undertook a systematic study of the weight of the parathyroid glands. They obtained their material from patients who had died from renal diseases as well as from patients who had died from a variety of other unrelated disorders. They reported that the mean weight of the parathyroids is significantly increased in any type of nephritis and from this conclude that: "It is possible that a certain proportion of cases of so-called hyperparathyroidism may be initiated by chronic renal disease."

The coincidental appearance of adenomata or hyperplasia of the parathyroid glands and kidney disease has been reported at various times. MacCallum (6) found an adenoma of the parathyroid gland in a patient who had died of chronic glomerulonephritis. Bergstrand (7), in a study of the parathyroid glands obtained from 200 autopsies, reported the associa-

tion of distinctly enlarged glands in those cases having severe damage to the kidneys. He also concluded from his studies that: "The histologic changes in the osseous system in osteitis fibrosa cystica are not pathognomonic for this disease. The same appearances are often seen with physiological lacunar absorption as well as in presence of a variety of pathological states." As an example of this, the author points out the appearance of pathologically increased resorption in cases of glomerulonephritis with and without parathyroid tumors.

A further illustration of this close relationship between the kidneys and the parathyroids is furnished by T. Hone in a paper published in "Lancet," in a study of the so-called "rubber jaw," a syndrome occurring in dogs with renal insufficiency. His investigation showed this to be an osteoporosis of the skull, hyperplasia of the parathyroids and "metastatic" calcifications in the tissues. The observer is certain that the renal lesion is the primary one. Not unlike this canine disorder is the condition noted in the case reported by Gutman, Swenson, and Parsons (8). Their patient had congenital polycystic disease of the kidneys and renal calculi. After the onset of severe renal insufficiency there occurred excessive decalcification of the vertebrae, ribs, and skull. The bones became soft, pliable and cystic and were the sites of pathological fractures. Surgical exploration revealed a 2 mm. tumor of one parathyroid and a smaller tumor of another. This case illustrates clearly the existence of a primary renal disorder with secondary parathyroid adenomata and hyperparathyroidism. They also reported a case of a girl, aged 24, with chronic nephritis who during life developed changes in the skull bones which roentgenologic examination showed to be a granular mottling identical with that seen in classical hyperparathyroidism.

Cases in the literature in which the presence of primary hyperparathyroidism is questioned often fall into the group presenting diffuse hyperplasia or multiple adenomata of the parathyroids. As suggested by Castleman and Mallory (9), such diffuse involvement points strongly to hyperplasia dependent on a generalized humoral stimulus (e.g., chemical) in contrast with the true neoplastic parathyroid enlargements.

It is true that in the majority of cases of renal insufficiency the blood calcium falls as the blood phosphate, due to retention, rises. Perhaps because of the marked impairment of excretion, calcium deposition may occur in the tissues. This has been repeatedly observed in renal insufficiency since the time of Virchow and was termed by him "calcium metastasis." In some cases the blood calcium tends to rise rather than to fall, the exact cause of such a deviation remaining uncertain. In the presence of hypercalcinemia small changes in the concentration of the carbon dioxide or local pH changes secondary to local trauma or to regional physiological processes, such as occur in the stomach, lungs and kidneys, may start a local nucleus for the formation of a calcified nodule. In this

way calcinosis and metastatic calcification may occur secondary to renal insufficiency with or without hyperparathyroidism.

It is, of course, important to know which of the two is the primary disease process, when renal disease and calcinosis are associated. If the hyperparathyroidism is primary, early parathyroidectomy will prevent permanent irreversible damage to the kidneys. If, on the contrary, the renal factor is primary, parathyroidectomy is of no assistance and is contraindicated. However, the differential diagnosis is often exceedingly difficult, as the following case history illustrates.

CASE REPORT

History (H.N. 369659). The patient, a woman aged forty-one, entered the hospital complaining of pain in both shoulders aggravated by motion. It had its onset eighteen months before admission, with sudden paroxysmal pain in the posterior aspect of both thighs. The pain would recur intermittently, gradually subsiding over a period of days. She became nervous and irritable. Six months after the onset, a generalized and intolerable pruritus developed. The skin became dry and showed a brownish pigmentation. At the same time polyuria with increased diurnal and nocturnal urinary frequency developed. There were no other symptoms referable to the urinary tract.

Six months preceding her admission to the hospital, she developed several subcutaneous painless swellings. One of the swellings subsequently became painful and tender. This was followed by pain in both shoulders. Her blood pressure was said to have been "190" at the onset of the illness. She lost about fifty pounds in weight since then.

Examination. The patient showed obvious loss of weight. The skin was yellowish-brown. She was alert and spoke with a rapid staccato speech. There was none of the eye signs usually associated with Graves' disease. The thyroid gland was apparently normal in size and consistency. No tumor was discernible in the neck. The heart and lungs were apparently normal to percussion and auscultation. The blood pressure was 153 mm. of mercury systolic and 76 mm. diastolic. A bilateral Babinski sign was found, as well as a left Chaddock and absent abdominal reflexes.

There were several nodules palpable beneath the skin, one on the dorsum of the left hand, a plum-sized mass at the base of the right thumb; a soft hemispherical mass occupied the medial aspect of the left knee, one at the right elbow, and one in the left infrascapular region. The enlargements at the base of the right thumb and over the toes were soft and contained yellowish white spots which were visible through the skin.

Laboratory Findings. The red blood cells numbered 3,400,000 and the white blood cells 4,300 per cubic millimeter of blood; the hemoglobin was 56 per cent. The urea nitrogen concentration was 96 mg. per 100 cc. of blood.

The concentration of calcium in the serum varied from 12 to 13 mg. in each 100 cc. The serum *phosphorus* ranged from 4 to 6.3 mg. in each 100 cc. The carbon dioxide combining power of the serum was 35 volumes per cent. The serum contained phosphatase to the extent of 5 Bodansky units in each 100 cc. (the normal being from 2 to 3.5 units).

The specific gravity of the urine was fixed at about 1.010. The urine contained moderate amounts of albumin. White blood cells were present in small numbers, both singly and clumped. The renal excretion of intramuscularly injected phenolsulphonphthalein was zero in two hours. Culture of the urine obtained under sterile precautions revealed the presence of Escherichi Coli (B. Coli).

Roentgen examinations revealed widespread calcium deposits in the buttocks, shoulders, both hands and left foot. The pelvic vessels showed marked calcification. On roentgen ray examination there was no osteitis fibrosa cystica of the type described by von Recklinghausen. No calculi could be demonstrated in the urinary tract. The right kidney, however, was well visualized on a flat plate technique. It was small and dense, and the presence of calcium deposits was suggested.

The basal metabolic rate determined on two separate occasions read +57 and +63 per cent respectively.

The nodule on the toe was biopsied and histological examination revealed marked calcium deposits with surrounding foreign body reaction of the giant cell type. There was no evidence of tumor.

Calcium tolerance test consisted in giving the patient 15 grams of calcium gluconate by mouth in the post-absorptive state. Blood was drawn first for control determinations and at periods of one, two, and three hours after the administration of the calcium by mouth. The calcium and phosphorus content of the blood serum was found to be as follows:

	CONCENTRATION OF CALCIUM IN EACH 100 C.C. SERUM EXPRESSED IN MG.	CONCENTRATION OF PHOSPHORUS (INORGANIC) IN EACH 100 C.C. OF SERUM EXPRESSED IN MG.
Fasting	13.1	6.45
1 hour	15.2	6.30
2 hours	14.7	5.88
3 hours	15.1	6.65

The significance of this test lay in the observation that the serum calcium remained elevated for the 3 hour period. It was thought to indicate the presence of an abnormal amount of parathormone which prevented the rapid removal of the calcium from the blood stream.

Her general condition declined and she became much weaker. The basal metabolic rate continued to fluctuate between +46 per cent and +62 per cent, and the blood pressure varied between 120 and 170 mm. systolic.

Course. The clinical impression was that of a coincidental association of chronic diffuse nephritis, hyperthyroidism and hyperparathyroidism. However, it was also thought that the damage to the kidneys might have been the result of calcification of the renal tubules (nephrocalcinosis) due to primary hyperparathyroidism. Although the renal damage was severe, it was felt that the only hope of improving the patient's condition lay in altering the metabolism by a subtotal thyroidectomy and parathyroidectomy.

After a preliminary period of lugolization and supplementary feeding of calcium and viosterol, an exploratory operation was performed upon the parathyroid gland. No adenomata of the parathyroids were found, but the parathyroids were noted to be enlarged. A subtotal thyroidectomy was done and two and one half parathyroids were removed. The parathyroids were reported by the pathologist to be larger than normal, and microscopic examination revealed a preponderance of chief cells with clear cytoplasm in compact masses, indicating hyperplasia of the glands. The thyroid gland showed no microscopic evidences of hyperplasia, commonly associated with Graves' disease.

The patient's progress immediately following the operation was satisfactory. On the first day postoperative the concentration of calcium in the serum decreased to 10.2 mg. per 100 cc. However, the concentration of urea nitrogen began to increase in the blood as the volume of urine decreased. The patient began to decline rapidly and terminal hyperpyrexia (108°F.) developed. She died on the sixth day after the operation in uremic coma.

NECROPSY FINDINGS

Gross Anatomy. Neck. On both lateral surfaces of the larynx are two small remnants of thyroid tissue measuring approximately 1 by 2 cm. each. On the posterior surface of the left can be seen a tiny, yellowish-brown parathyroid body.

The larynx shows no grossly abnormal features except for a slight thickening and calcification of the posterior portion of the cricoid cartilage.

Lungs. They are uniformly grayish-pink in color with an irregular coarse black mottling, and over the surface of both lungs there is a diffuse network of very narrow yellowish-gray lymphatic channels. The right lung presents two nodules in the apical region which are very firm, definitely circumscribed though not encapsulated, approximately spherical and separated from each other by a distance of 5 cm. On section these nodules cut with increased resistance and give a scraping sound; they measure approximately 2 cm. in diameter, are pinkish-gray, with irregular whitish streaks, and appear definitely porous. In one portion of one of these nodules a gaping vessel can be seen. In the apex of the left lung immediately beneath the pleura is a small, irregular, firm mass which is fairly

well defined and circumscribed, and on section reveals a very thick, firm, grayish-black, calcified wall with a small cavity in the center, which is not in communication with any bronchi. Along the interlobar fissure in the left upper lobe, one near the inferior portion and the other about 5 cm. from the apex, are two nodules similar to those described in the right apex, but slightly larger in size and of different shape, one being triangular and the other rectangular on section. Both lower lobes contain a few small, pink, dry, porous areas. The paratracheal and bronchopulmonary nodes are markedly enlarged to a varying degree. They are fairly soft; on section there can be seen irregular, grayish-white, firm streakings which give a scraping sensation when cut. The rest of the node is a diffuse grayish-black and moist. These nodes are distinct from each other. In the left hilar region there is an anthracotic calcified node (tuberculous).

Heart. The heart weighs 280 gm. There is a moderate amount of epicardial fat. The left auricle and ventricle are slightly dilated The right auricle and ventricle are of normal size. The myocardium is abnormal in thickness and consistency and is reddish-brown throughout. The tips of the papillary muscle of the left ventricle present a number of tiny, yellow, pin-point flecks which on section are seen to penetrate for a short distance onto the substance of the muscle. Near the base of the papillary muscle there is a small amount of yellow streaking alternating with the reddish-brown color of the myocardium.

The *gall-bladder* is somewhat dilated and filled with dark green bile. The wall is slightly thickened and the mucosal surface is dark greenish-brown. There are about 7 to 8 small, greenish-black, pitted, mulberry-like stones lying free in its interior and one larger stone impacted in the cystic duct at its origin.

Adrenals. The right adrenal is normal in size and consistency. On section the central part of the gland is occupied by a mass which is roughly about 7 mm. in diameter. A narrow (3 mm. in diameter) projection extends from this into the medulla for about 3 cm. This mass is globular in outline, of homogeneous deep brownish-black color and somewhat firmer than the rest of the adrenal tissues; it lies entirely in the medulla and compresses and thins the cortex to a slight degree. The left adrenal contains a pin-head size mass in the medulla which is similar to the above-mentioned mass. The cortices of both adrenals are very yellow.

Kidneys. Both kidneys are markedly reduced in size, the right weight 50 g. and left 70 g. The capsule of the right kidney strips with moderate ease and reveals a surface which is marked by large, irregular, smooth, knob-like, moderately soft, pale brownish-yellow projections of varying size, which are separated from each other by dark reddish-brown, firm, granular depressions arranged in a disorderly fashion. On section the difference between the raised and depressed areas is seen to a marked degree. The latter contain very little cortical tissue, averaging 1 to 2 cm.,

are very dense, firm and of a reddish granular appearance. The cortex of the raised area is much thicker, varying between 1 and 2 cm. and is pale yellow, somewhat softer, with fairly definite markings. The glomeruli cannot be distinguished with ease. The medulla is slightly thinned and brownish-yellow. In its substance can be seen pin-point size yellowish areas (urate crystals?). The pelvis is relatively dilated and occupies about one-quarter of the cut surface. It presents no gross abnormalities. The capsule of the left kidney strips with some difficulty and is considerably thicker than the capsule of the right kidney. In all other respects the left kidney is essentially similar to the right. The pelvis of the left kidney is somewhat congested.

The *bladder* is of normal size; the mucosal surface is moderately injected. The ureteral and urethral orifices are patent. On the posterior surface of the bladder is a small (3 mm. in diameter) hard nodule in the course of a vein.

The *stomach* is slightly dilated. The mucosal surface is injected and on close inspection one sees tiny nodular projections scattered over the entire surface, importing a somewhat coarsely granular mosaic appearance.

Bone. The bone marrow of the vertebrae (third and fourth lumbar) is red and slightly soft, yielding a little marrow on scraping. It is not porous.

Microscopic Anatomy. The *lung.* Many of the alveolar walls are moderately thickened and in places infiltrated with calcific deposits. There is no inflammatory exudate. Similar calcium deposits are seen in the bronchial walls. The vessels show no pathological changes. The stomach reveals no deposits of calcium.

Kidneys. The capsule is considerably thickened in an irregular fashion. The thickening is composed of fibrous tissue with a moderate lymphocytic infiltration. The glomeruli are compactly arranged, as though pulled together by scar tissue. The glomerular capsules are thickened. Many of the glomular tufts show various stages of hyalinization to the extent of complete obliteration. There is marked increase of interstitial tissue in both the cortex and medulla. The increase is due to connective tissue with a lymphocytic infiltration. The cells of the proximal convoluted tubules show granular swelling with degeneration. There is a moderate amount of calcium deposition in the distal convoluted tubules. Calcium deposits are also seen in the stroma of the medulla. The medium sized arteries show a moderate thickening of the intima with some encroachment on the lumen and reduplication of the elastica. With one exception several other sections from the kidney show no calcification.

Summary of the Anatomical Findings. Calcinosis with involvement of lung, paratracheal and inguinal nodes, heart and cricoid cartilage; arteriosclerosis of the aorta and of the pulmonary artery; healed calcified tuberculosis (left apex); bilateral medullary adenomata of the adrenals

(pheochromocytoma); hypertrophic gastritis; chronic cholecystitis with cholelithiasis and hydrops of gall-bladder.

COMMENT

A group of cases are reported in the literature in which the differentiation between primary hyperparathyroidism with renal insufficiency and primary renal insufficiency with secondary hyperparathyroidism is of considerable theoretical and practical importance. The mechanisms at work, however, make such differentiation very difficult. In hyperparathyroidism with secondary renal involvement the typical hypercalcinemia may not be obvious because of the inhibiting effect on calcium mobilization caused by phosphate retention. In renal insufficiency without parathyroid involvement it has been repeatedly observed that the serum calcium is depressed, but in some cases there is a secondary rise in the serum calcium. The explanation offered for this is a compensatory hyperplasia of the parathyroid glands. In support of this, attention was called to a type of parathyroid hyperplasia and multiple adenomata frequently found in association with chronic renal insufficiency. This is in contrast to the single neoplastic enlargements of the parathyroid associated with primary hyperparathyroidism.

The symptomatology of the case herein reported was that of hyperparathyroidism with hypercalcinemia and metastatic calcifications. The early clinical diagnosis was that of primary hyperparathyroidism. Accordingly parathyroidectomy was performed and the hyperplasia of the parathyroids was found. Post mortem studies, however, showed it to be a case of the long-standing renal disease with secondary hyperparathyroidism.

It is felt that the development of a parathyroid syndrome in chronic renal disease should be more widely recognized. Close study of such cases will assist in ascertaining whether the primary disorder lies in the kidneys or in the parathyroids. Acceptance of too easy criteria in regarding such cases as primary hyperparathyroidism should be avoided, and unnecessary parathyroidectomy in the presence of renal insufficiency will thus be obviated.

REFERENCES

(1) Hunter, D.: Significance to Clinical Medicine of Studies in Calcium and Phosphorus Metabolism. Lancet, 1: 897, 947, 999, 1930.

(2) Barr, D. P., and Bulger, H. A.: Clinical Syndrome of Hyperparathyroidism. Am. J. M. Sc., 179: 449, 1930.

(3) Aub, J. C.: Calcium and Phosphorus Metabolism. Harvey Lecture, 1928–1929, p. 151, 1930.

(4) Albright, F., Baird, P. C., Cope, O., and Bloomberg, E.: Studies on Physiology of Parathyroid Glands: Renal Complications of Hyperparathyroidism. Am. J. M. Sc., 187: 49, 1934.

(5) Pappenheimer, A. M., and Wilens, S. L.: Enlargement of the Parathyroid Glands in Renal Disease. Am. J. Path., 11: 73, 1935.

(6) MacCallum, W. G.: Tumor of the Parathyroid Gland. Bull. Johns Hopkins Hosp., 16: 87, 1905.
(7) Bergstrand, H.: Parathyroid Bodies and Bright's Disease. Acta Med. Scan., 53: 644, 1921.
(8) Gutman, A. B., Swenson, P. C., and Parsons, W. B.: The Differential Diagnosis of Hyperparathyroidism. J. A. M. A., 103: 87, 1934.
(9) Castleman, B., and Mallory, T. B.: The Pathology of the Parathyroid Gland in Hyperparathyroidism. A Study of 25 Cases. Am. J. Path., 11: 1, 1935.

John Cohen

January 3, 1891–January 24, 1936

On January 24, 1936 Dr. John Cohen died at the age of 45. He was born in Balta Podol, Russia and emigrated to the United States at the age of 12. He graduated from the Mount Morris High School and later from Harvard University and Medical School. During his undergraduate period he became a commissioned officer in the United States Aviation Corps, where he served as instructor in aviation. Like many emigrés in poor circumstances, Dr. Cohen was in every sense a self-made man. He employed his few spare moments to earn sufficient income to pay for his studies. Shortly after receiving his medical degree, Dr. Cohen was invited to work with Minot in Boston. There he soon displayed his scientific ingenuity in devising apparatus for the study of blood cell respiration. These studies were amongst the earliest undertaken in this important field. After several years with Minot, Dr. Cohen was invited to join the laboratory staff of The Mount Sinai Hospital in the capacity of assistant in hematology.

It was during this period, ten years ago, that I met him. I was immediately drawn to him through his gentle personality. It was this outstanding characteristic that won for him devoted friends among his colleagues in The Mount Sinai, Montefiore and Beekman Street Hospitals, as well as among his patients.

It was not long before I recognized Dr. Cohen's imaginativeness and talent in devising new technical methods and planning experiments. Shortly after undertaking a series of investigations on the pathogenesis of lung suppuration, to which he made fundamental contributions, the bacteriological department of The Mount Sinai Hospital saw fit to entirely replace the previously employed anaerobic technique with that devised by Dr. Cohen.

Dr. Cohen was an indefatigable worker. In spite of his connections with a number of institutions, he did not hesitate to spend his energies in many medical activities and to give freely of his medical skill and sympathy to his patients. They loved him as much for his kindness and understanding as they admired him for his thoroughness and competence as a physician.

The many who knew Dr. Cohen and loved him will miss the gentle smile of the man, the loyal and deep devotion of the friend, and the stimulating influence of the physician seeking after truth.

Louis Gross.

Charles Klingenstein

January 5, 1868–February 10, 1936

In the recent death of Mr. Charles Klingenstein the Medical Staff of The Mount Sinai Hospital has sustained a great loss. Mr. Klingenstein was a man of charming personality. His genial character and sense of fairness permitted the members of the staff to seek his advice and counsel on all matters pertaining to organization and development of the service. He had a deep and sincere interest in the affairs of the hospital, concerning which he was most intimately informed, and it was this minute and accurate information which enabled him to be of great material benefit to the institution.

We mourn him sincerely, and we will miss his wise counsel and generous aid. To the family of Mr. Klingenstein, the Medical Staff extend their deepest sympathy assuring them that he will always be in their hearts as a friend.

Isidore Friesner, M.D.,
President of the Medical Board.

CLINICAL PATHOLOGICAL CONFERENCE

Wednesday, November 6, 1935

GEORGE BAEHR, M.D., AND PAUL KLEMPERER, M.D., *presiding*

CASE 1. ACUTE PHLEGMONOUS LARYNGITIS, MEDIASTINITIS AND CONFLUENT BRONCHOPNEUMONIA. (From the Medical Service of Dr. B. S. Oppenheimer and the Laryngological Service of Dr. Rudolph Kramer.)

History (Adm. 386257, P.M. 9725). The patient was a female hospital employee, 25 years of age, who was admitted to the ward because of a sore throat of two days duration, pain in the neck, hoarseness, and a temperature of 101°F.

Examination. On admission, the patient was in extreme discomfort because of the pain in the pharynx. There was no respiratory distress at this time. The



FIG. 1. Case 1. Widening of superior mediastinum and irregular infiltration of right lower lobe

only significant physical signs were referable to the throat and neck. The pharynx was only slightly injected. The larynx was congested and the aryepiglottic folds were edematous. Moderate tenderness was present over the thyroid cartilage and submaxillary regions. The diagnosis was *acute laryngitis.*

Course. On the day following her admission, the patient became toxic and developed inspiratory stridor and wheezing. There was marked increase in the laryngeal edema so that it became necessary within twenty-four hours to perform scarification of the edematous areas about the epiglottis and aryepiglottic folds. This gave her relief from the stridor. On the third day the temperature rose to 105°F., and she complained of pain in the neck and the region of the upper sternum. The edema of the larynx had subsided considerably, but there now appeared a fulness about the left arytenoid. Also, there developed a very tender swelling in the left side of the neck obliterating the left supraclavicular fossa. A roent-

genogram of the chest (Fig. 1) disclosed widening of the superior mediastinal shadow and an infiltration in the right lower and right middle lobes. It was felt that the patient now had mediastinitis and pneumonia. The temperature on the fourth day remained at about 104°F., and although the swelling on the left side of the neck subsided somewhat, the trachea remained displaced to the right. On the fifth day she had marked respiratory difficulty, gasping for breath. Considerable purulent secretion was found in the larynx. Coarse moist râles were audible throughout the chest. The patient died on the fifth day after admission.

Post Mortem Findings. There was found a phlegmonous infiltration of the tissue between the hypopharynx and the larynx. The left half of the larynx was infiltrated with involvement of the vocal cord and the ventriculus of Morgagni on that side. This phlegmon extended downward along the trachea to the diaphragm, posteriorly involving the anterior wall of the oesophagus, and to the right producing a pleuropericardial inflammation. There was present also an acute endophlebitis of the superior vena cava, due to an extension of the infection from the surrounding phlegmon into the wall of the vein. A confluent bronchopneumonia was found in both lower lobes. The causative organism was staphylococcus aureus.

Comment. Dr. Klemperer, while stressing the relative infrequency of this condition, recalled a case, presented at an earlier conference, in which death was caused by collateral edema of the larynx secondary to a phlegmonous pharyngitis.

Dr. Kramer said that as a rule cases of phlegmonous or edematous laryngitis subside when appropriate therapy is applied. Occasionally, as in this case, the phlegmon extends into the mediastinal structures with fatal issue, in spite of any measures that may be taken. This probably is dependent on the peculiar virulence of the infecting organism, since in some years these infections occur in greater numbers than in others.

Case 2. Carcinoma of the Bronchus and Pulmonary Tuberculosis. (From the Medical Service of Dr. George Baehr.)

History (Adm. 382454, P.M. 9657). The patient, a man aged fifty years, was first studied in the Consultation Service five months before admission to the hospital. He complained of a chronic cough of twenty-five years duration and the development of weakness, swelling of the feet, and enlargement of his finger-ends during the past month. Physical and X-ray findings pointed to chronic tuberculosis of the left upper lobe. The roentgenograms also disclosed a shadow in the right upper lobe near the mediastinum which was interpreted as a recent exudative lesion. Tubercle bacilli were not found in the sputum. The patient went to a sanatorium where, two months later, it was noted that the lesion in the right upper lobe had enlarged considerably and had assumed the configuration of a spherical mass. Repeated sputum examinations failed to reveal tubercle bacilli. The clubbing of his fingers, joint pains, and cyanosis became progressively more pronounced, and he returned to The Mount Sinai Hospital.

Examination. The patient, on entering the hospital, was moderately cyanotic. The right palpebral fissure was narrower than the left and the right pupil larger than the left. It was noticed that the right chest lagged behind the left on expansion. Dulness and diminished breath sounds were present over the right upper lobe, while coarse râles were audible at both bases. No significant physical signs referable to the heart were elicited. The blood pressure was 105 systolic

and 70 diastolic. There was marked clubbing and tenderness of the fingers and toes. A roentgenogram of the chest showed a circumscribed shadow in the posterior portion of the right upper lobe, extending from the level of the third to that of the sixth rib posteriorly. It had the appearance of a primary parenchymal carcinoma of the lung. On the left side, extending from beneath the clavicle to the level of the second intercostal space, there were two irregular fibrotic and calcified nodules representing old tuberculous lesions. X-ray examination of the lower extremities revealed irregular thickening of the periosteum of the lower portions of both tibiae and both femora.

Course. The patient was bronchoscoped, and the right upper-lobe bronchus was found to be compressed antero-posteriorly. A biopsy of granular mucosa taken from the upper paravertebral bronchus showed no significant histological changes. During the stay in the hospital the patient complained chiefly of severe pain in the hands and lower extremities. This was attributed to the marked osteoarthropathy. On several occasions the patient had transitory attacks of auricular fibrillation and on one occasion he complained of severe precordial pain, radiating through to the back, which required an opiate. During the third week he again had an agonizing attack of precordial pain. There was no associated dyspnea or cyanosis. The pulse was irregular. Sedatives proved ineffectual, and the patient went into collapse. He died eight hours after the onset of this acute episode. Death was interpreted as due to a coronary artery occlusion.

Post Mortem Findings. The right upper lobe was prominent and firm due to the presence within it of a large hard globular tumor mass (8 x 10 cm.), definitely demarcated from the surrounding parenchyma. On cut section this mass was yellowish-gray with a coarsely granular surface streaked with greenish-black pigment. The right paravertebral branch bronchus was found to be retracted upward and its lumen reduced in size. The mucosa was thickened and granular, showing in its distal portion finely nodular irregularities. This branch bronchus could be traced for about 2 cm., after which it was lost in the tumor mass described. Directly above the upper pole of the tumor mass there was a circular area (2 x 2 cm.), consisting of broken-down, yellowish, chalky material. The hyaline membrane surrounding this area had been ruptured at one point by the adjoining carcinoma. In the left upper lobe there were present two ovoid areas containing calcified and caseous granules. These on section had the appearance of Roquefort cheese. A primary infect was located in the left lower lobe. The other lobes on section showed an irregular scattering of split-pea sized areas of metastatic growth. The hilar and paratracheal nodes were markedly enlarged. The superior vena cava was ensheathed by these metastatic nodes and at one point invaded by them, forming a polypoid excrescence (1 cm.) within the lumen. A similar encasement of the arch and distal end of the ascending aorta was present. This caused considerable narrowing of the aortic lumen at this site. The proximal portion of the ascending aorta was somewhat dilated. There was a small area of tumor growth in the pericardium. The coronary arteries were patent.

Comment. It was pointed out (Dr. Klemperer) that the tuberculous lesions present in the upper lobes were similar in character and that only the one on the right side showed progression and exacerbation of activity. This was attributed to the perforation of the capsule surrounding the tuberculous lesion on the right side by the invading neoplasm. Although neoplasms may originate in the wall

of the tuberculous cavity, no causal relationship between the tuberculous and neoplastic lesions in this case was thought to have been present, since in this instance the carcinoma originated independently from a branch bronchus below the tuberculous lesion.

Attention was drawn to the significance of the attack of anginal pain which, in the opinion of Dr. Baehr, may have been in the nature of an aortalgia, and was probably caused by the dilatation of the proximal aorta in consequence of the narrowing of the ascending aorta and the aortic arch by the constricting neoplasm. The value of the presence of pulmonary osteoarthropathy in the differential diagnosis between tuberculosis and carcinoma of the lung was stressed. It was pointed out that clubbing is much more common in cases of pulmonary neoplasm. It may be observed occasionally in patients with tuberculosis cavities which are secondarily infected with pyogenic organisms, but even under these circumstances, the arthropathy is seldom as pronounced as in cases of pulmonary carcinoma. Such findings should arouse the clinician's suspicion of a complicating carcinoma of the lung, even though the patient, as in this case, may also have apical tuberculosis.

Case 3. Subacute Glomerulonephritis Treated with Decapsulation. (From the Pediatric Service of Dr. Bela Schick.)

History (Adm. 374660, P.M. 9673). The patient was a girl, eleven years old, who at the age of nine years was hospitalized for three weeks because of scarlet fever. There were no abnormal urinary findings during this illness or one year thereafter. Two weeks before her recent admission to The Mount Sinai Hospital, the child took sick with a cold, developed a cough and complained of a sore throat. The temperature was 101°F. After four days she recovered and returned to school. Eight days later she complained again of a sore throat, of headache and vertigo, and the temperature rose to 104°F. Her face and lower extremities became edematous. It was noted at this time that the urine was cloudy.

Examination. On admission the child's temperature was 101.5°F. Her face was puffy, and she had pitting edema of the lower extremities. The urine had a specific gravity of 1.018, boiled solid with albumin, and had many hyaline and granular casts and occasional red and white blood cells. The blood urea was 9 mg. per 100 cc. Total protein in the blood amounted to 4.2 per cent with albumin being 2.2 per cent and globulin 2 per cent. The blood cholesterol was 500 mg. per 100 cc. The impression was that the patient had acute pharyngitis and acute glomerulonephritis.

Course. On the third day in the hospital the child's temperature subsided and at the end of one week the edema of the face and legs disappeared. The patient's condition remained relatively unchanged for a month. Then the edema of the face and legs recurred. The blood urea was now elevated to 16 mg. per 100 cc., and the blood protein had risen to 5.8. It was now found that the basal metabolic rate was minus 9 per cent. In spite of the intravenous administration of thyroxin, the cholesterol of the blood rose to 711 mg. per 100 cc. The patient was now believed to be in the *nephrotic phase of subacute glomerulonephritis.* At the end of the second month in the hospital the child suddenly developed a chill, and the temperature rose to 104°F. The blood pressure was found to be elevated to 160 systolic and 80 diastolic. She began to complain of headache and nausea.

There was also abdominal pain with spasticity and tenderness in the left upper quadrant. An irregular erythematous area appeared about the umbilicus. As these symptoms subsided three days later, they were interpreted as having been due either to a superficial infection of the abdominal wall or an intercurrent pyelitis. During the third month there was a brief period when the child again had edema of the face and neck. The blood cholesterol at this time reached a high level of 1000 mg. per 100 cc. The blood protein remained depressed. Toward the end of the fourth month she developed another upper respiratory infection followed by bilateral suppurative sinusitis and cellulitis of the cervical tissues. The hemoglobin fell to 35 per cent, and she was given several small transfusions and appeared to have recovered from the recent infection in the course of the next four weeks.

During the last two of the nine months of her stay in the hospital, she had repeated attacks of convulsive seizures, headache, dizziness (hypertensive encephalopathy) which could not be controlled by any of the known therapeutic procedures such as the intravenous administration of magnesium sulphate, hypo-

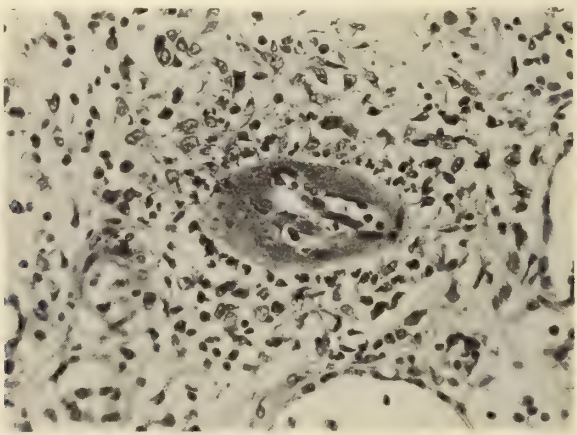


FIG. 2. Case 3. Acute necrotizing arteriolitis in the kidney

dermoclysis of the same drug, or lumbar puncture. During this period her blood pressure rose to 190 systolic and 118 diastolic. It was now noted for the first time that she had papilledema, an unusual finding in chronic glomerulonephritis. As a last resort decapsulation of the kidneys was performed, but the patient died thirty minutes after the operation.

Post Mortem Findings. The heart showed marked generalized hypertrophy and dilatation. The kidneys were greatly enlarged, and their surfaces were yellowish-pink and diffusely dotted by fine, pin-point, yellowish-gray, granular areas. Among these there were occasional pin-head sized, hemorrhagic spots. The cut section revealed a definite cortico-medullary demarcation and the glomeruli could be visualized as large red dots. Among the other gross findings were pulmonary congestion and edema, anasarca, acute passive congestion of the viscera, and atheromatosis of the aorta.

Microscopic sections of the kidney showed in addition to a marked intracapsular glomerulonephritis that practically every vas efferens was the seat of a

necrotizing arteriolitis (Fig. 2). These vessels were markedly thickened and showed considerable imbibition of fatty substance. Vascular lesions similar to these were found within the spleen and pancreas.

Comment. Attention was drawn (Dr. Baehr) to the extrarenal vascular lesions in acute as well as in chronic glomerulonephritis and to the fact that vascular damage outside the kidney in acute glomerulonephritis may be out of all proportion to the intrarenal vessel injury. It may cause myocardial damage with attendant circulatory failure and death or pronounced symptoms referable to the nervous system considerably prior to the development of renal insufficiency. The finding of a true necrotizing arteritis, lesions of so-called malignant arteriosclerosis, in this case of subacute glomerulonephritis is therefore not surprising. The papilledema in this case is now explained by this finding. The low blood protein found on the initial determination was in the opinion of Dr. Baehr the result of a prolonged albuminuria. The hypercholesteremia occurring in patients with the nephrotic syndrome was referred to and the value of thyroxin in effecting diuresis in such cases was emphasized. Although the primary effect of thyroid medication is to lower the blood cholesterol, excessive administration of thyroid in cases of nephritis and nephrosis with hypercholesteremia will increase the blood cholesterol greatly. In this case the blood cholesterol rose to 1000 mg. per 100 c.c. (1 per cent) under the influence of excessive amounts of thyroxin. Dr. Baehr has observed blood cholesterol values of 1800 mg. per 100 c.c. in a case of chronic nephritis with a nephrotic syndrome, in which huge doses of thyroid had been given for a prolonged period.

Case 4. Subacute Glomerulonephritis with Severe Extrarenal Vascular Lesions. (From the Medical Service of Dr. George Baehr.)

History (Adm. 378557, P.M. 9531). The patient, a woman who was 66 years old, had painless jaundice four years previously, lasting six days. Three months before admission to the hospital she began to complain of sticking pain and soreness in the right upper quadrant. She had gaseous eructations after eating; her appetite decreased, and she lost twenty pounds during this period. Six days prior to hospitalization she began to vomit once or twice a day. The patient noted that the urine was bloody and that there was a decrease in urinary output. During the three days immediately preceding her admission she had epistaxes amounting to about a glassful of blood. Following these she occasionally vomited blood.

Examination. The patient's color was distinctly pale, and her breath had a urinous odor. The heart and lungs were negative. The abdomen was tympanitic. Tenderness was present in the right loin. The blood pressure was 150 systolic and 86 diastolic. The hemoglobin was 41 per cent, and there were 2,120,000 red blood cells per cubic millimeter. The urine was red and smoky. Its specific gravity was 1.010, and it contained 2 plus albumin and innumerable red blood cells and clumped white blood cells. The blood chemistry findings were as follows: urea nitrogen, 51 mg. per 100 c.c.; creatinin, 6.5 mg. per 100 c.c.; calcium, 10.1 mg.; phosphorous, 6.6 mg.; chlorides, 500 mg. per 100 c.c. It was thought on admission that the patient had bilateral pyelonephritic contracted kidneys and nephrolithiasis.

Course. X-ray examination of the abdomen failed to show any urinary calculi. Cystoscopy yielded bloody fluid from both renal pelves. Despite the

administration of intravenous fluids and transfusions, the patient's urinary output diminished progressively. The urine consistently contained red and white blood cells, and the blood urea nitrogen rose to 115 mg. per 100 c.c. She became increasingly stuporous and died nine days after admission.

Post Mortem Findings. The heart showed a universal organizing pericarditis. The kidneys were of moderate size; their external surfaces were dotted with innumerable pin-point to pin-head sized, round hemorrhages. The corticomedullary demarcation on cut section was indistinct. The glomeruli stood out as dull gray dots. The kidney pelves showed several small hemorrhagic areas. In addition to these findings there were present a hydrothorax on the left side, ascites, passive congestion of the lungs and liver, chronic cholecystitis and cholelithiasis.

It was found on microscopic examination that the kidneys were the seat of a severe glomerulitis, predominantly of the extracapillary type. The splenic arterioles showed a severe, inflammatory, necrotizing lesion, illustrating again that vascular damage in glomerulonephritis is not always limited to the kidneys.

Comment. In this case, in spite of the protracted vomiting and the drop in blood chlorides which supervened, there was no alkalosis. This was explained by the fact that the latter effect was adequately neutralized by the retention in the blood of phosphoric acid due to renal insufficiency.

Case 5. Subacute Glomerulonephritis with Necrotizing Arteritis of the Liver and Pancreas. (From the Medical Service of Dr. B. S. Oppenheimer.)

History (Adm. 382846, P.M. 9661). The patient was a girl, 21 years old, who had intermittent swelling of the ankles and eyelids following a mild sore throat fifteen months before admission to the hospital. Ascites developed five months later and the patient was treated for nine months at another institution, where her abdomen was "tapped" seven times, the last paracentesis having been done five weeks before her entrance into this hospital. During the last month at home, ascites reappeared and was accompanied by recurrent edema of the arms, legs, eyelids, back and abdomen. She became dyspneic and orthopneic, and complained of muscular weakness. Oliguria and nocturia set in, and the patient was admitted to this hospital.

Examination. The patient was very pale and presented a striking appearance because of the disproportion between the small size of the face and the huge abdomen. There was a marked generalized edema of the subcutaneous tissue up to the neck, arms, and chest. The retinal vessels were markedly narrowed and there were numerous white, pin-head sized, hard "exudates" throughout the fundi, especially at the temporal halves and about the maculae. The neck and supraclavicular fossae were edematous. Dulness and diminished breath sounds were present at both lung bases. Percussion disclosed considerable widening of cardiac flatness, while the heart sounds were of surprisingly good quality. The abdomen was tremendously distended with fluid. The systolic blood pressure was 190 mm. of mercury and the diastolic, 130. The hemoglobin was 50 per cent, and there were 2,890,000 red blood cells per cubic millimeter. The urine had a specific gravity of 1.012 and constantly showed 3 plus albumin and an average of 10 to 15 red blood cells per high powered field. The blood protein amounted to 4.1 per cent with albumin constituting 3 per cent and globulin 1.1 per cent. The urea

nitrogen in the blood was 50 mg. per 100 c.c., and the blood cholesterol was 310 mg. per 100 c.c. The circulation time and venous pressure were within normal limits. It was believed that the patient was suffering from chronic glomerulonephritis in the nephrotic phase.

Course. Paracentesis abdominis was performed, and 11 liters of clear, straw-colored fluid were removed. The patient appeared more comfortable after this. One week after admission she became increasingly dyspneic and orthopneic. It was thought that cardiac embarrassment was due to a pericardial effusion. Aspiration was therefore performed, and 250 c.c. of serosanguineous fluid were evacuated. On the sixteenth day in the hospital, her condition appeared unchanged. While sitting up in bed and having her breakfast, she suddenly screamed, fell back in bed, gasped several times and died within a few minutes. The sudden exitus was attributed to a pulmonary or cerebral embolism.

Post Mortem Findings. The abdomen was distended. It contained 6 liters of fluid. The pericardial sac contained about 800 c.c. of blood-tinged fluid. The heart was hypertrophied and dilated. In some areas the myocardium of the left

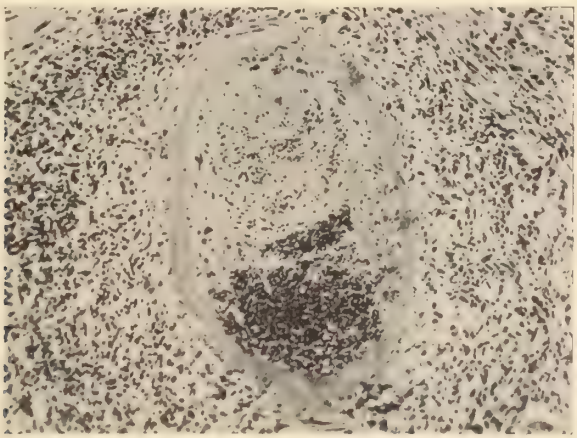


FIG. 3. Case 5. Acute necrotizing arteritis with thrombosis in the liver

ventricle showed on section irregular areas and streaks of grayish-white tissue. On the endocardial surface of the anterior wall of the left ventricle there was present an adherent thrombus. There was no evidence of pulmonary or cerebral embolism. The external surface of the liver appeared mottled with depressed, reddish-purple areas (4 x 3 cm.) and raised yellowish areas (8 x 10 cm.). This mottling was also visualized on the cut surface. The spleen showed multiple small infarcts. The kidneys were large, and their surfaces had a purplish-brown color, stippled with yellowish-white, pin-point areas. The cortex was somewhat widened and within it could be seen translucent gray and red glomeruli.

The microscopic studies revealed most interesting changes. There was an intra- and extracapillary glomerulitis. The heart muscle showed foci of acute myomalacia. The latter and the lesions noted grossly in the liver were due to the presence of a severe necrotizing arteritis and periarteritis. In the liver the latter process showed varying gradations. Some medium-sized vessels showed

the acute inflammatory and necrotic lesions; others showed beginning organization while still others showed almost complete obliteration (Fig. 3) of the vascular lumen by intimal proliferation. There were occasional thrombi within central veins, attesting to the concomitant involvement of the venous system.

Comment. The identity of the extrarenal vascular lesions with those seen in periarteritis nodosa was stressed. It was pointed out, however, that the clinical and pathological findings were consistent only with the viewpoint that this was essentially a case of subacute glomerulonephritis in the nephrotic stage, associated with diffuse arteritis and periarteritis.

The presentation of the last three cases of subacute and chronic glomerulonephritis was concluded by remarks in which Dr. Baehr emphasized the following:

(1) The disease known as glomerulonephritis is characterized by an injury to the vascular apparatus throughout the body. The damage to the vessels of the brain or myocardium may at times be more significant clinically than the renal injury and may cause death in the acute stage of the disease. The edema in acute glomerulonephritis is also an expression of this widespread extrarenal vascular injury.

(2) Extrarenal arteriolar lesions occur also at times in the late chronic stage of glomerulonephritis. The clinical picture which ensues in the terminal stage of glomerulonephritis is often due to these progressive renal and extrarenal vascular changes and for this reason may be identical with that of the terminal stage of essential hypertension.

Reported by Frederick H. King, M.D.

BOOK REVIEWS

Electrokinetic Phenomena and Their Application to Biology and Medicine. Harold A. Abramson, M.D. American Chemical Society Monograph Series, No. 66. Pp. 331, 107 illustrations, New York, Chemical Catalog Co., 1934.

Although the reactions typical and fundamental for the living cell are usually studied in homogenous systems, the cell itself is a colloidal system and the ultimate testing of the application of homogenous reactions in the living cell requires the study of simple processes in the presence of surfaces and at surfaces.

Dr. Abramson endeavors to cover the important group of liquid/solid and liquid/liquid interfaces. Included in his presentation are the properties of protein surfaces, lipoid surfaces, inorganic surfaces and, which is perhaps of more interest to the practising physician, the surface properties of blood corpuscles, spermatozoa, bacteria, antibody globulins, etc. He also discusses the nature of the changes occurring at bacterial and other surfaces incidental to immunological reactions. The method of electrophoresis enables the experimentalist to distinguish between blood corpuscles of the various animal species and to analyse with a simple tool the nature of the reaction of blood corpuscles to specific antisera. Of some clinical importance is the fact that the difference between various types of hemolysis can be approached in this manner. Another application of practical interest concerns the formation of iso-spermatoxins in adult females. If female animals are injected with spermatozoa, antibodies against these spermatozoa are built up. The union between the antibodies and the spermatozoa can be followed by measurements of the electric charge of the latter. It has been shown that one may readily differentiate the first three types of pneumococcus by their electric charge. In other words, the net charge of the surface is determined by the chemical patterns which characterize the surface of these organisms and impart to them immunological type specificity. In phagocytosis, the alteration of the bacteria by biological and chemical factors can be evaluated by electrokinetic methods and can be correlated with studies of the engulfment of the microörganisms.

The reader should not be discouraged by the mathematical treatment in the introductory chapters. In general, the monograph touches many points which the clinician interested in the mechanism of biological and especially colloidal reactions will find stimulating for the study of his own problems.

H. S.

Tumors of the Urinary Bladder. Edwin Beer, M.D., F.A.C.S. Pp. 166, 52 illustrations, Baltimore, William Wood & Co., 1935.

This monograph on tumors of the urinary bladder is a most comprehensive exposition of a rather complicated subject and comes at an opportune time. There has appeared in recent years such a voluminous literature on bladder neoplasms, with so many contradictory statements, that a clear elucidation such as we find in this monograph is welcome. In its twelve chapters the entire field is covered in such a concise yet thorough manner that it will serve greatly to clarify many of our concepts.

Because of the author's numerous well known contributions to this subject since 1910 when he first introduced the high frequency transurethral treatment of papilloma of the bladder, and because it represents a careful study of an exhaustive material embracing over 650 vesical neoplasms, the book may be considered an important contribution to the literature. Introduced by an historical sketch of considerable interest, it is followed by a chapter on the pathology of vesical growths. The author's classification of neoplasms makes this chapter of especial value to the pathologist and urologist and serves as the basis for therapeutic indications. A full chapter is devoted to symptomatology and diagnostic procedures.

Eight chapters are devoted to the various methods of treatment. All phases of therapy, cystoscopic and operative procedures, radium and deep X-ray, as well as the indications for each method described, are fully discussed. The monograph is further enhanced by numerous excellent illustrations and colored plates of the cystoscopic appearance of benign and malignant tumors, and also by an extensive bibliography.

The last chapter is of particular interest and value because of a summary and synopsis with a statistical compilation showing the end results obtained from the various types of treatment.

A. H.

ABSTRACTS

Authors' Abstracts of Papers Published Elsewhere by Members of the Mount Sinai Hospital Staff

Members of the hospital staff and the out-patient department of The Mount Sinai Hospital are invited to submit for publication in this column brief abstracts of their articles appearing in other journals.

Enlargement of the Heart due to Abnormal Glycogen Storage in von Gierke's Disease. William Antopol, Julius Heilbrunn, and Lester R. Tuchman. Am. J. M. Sc. 188: 354, September 1934.

The case of a four and one-half month male with von Gierke's disease was presented. Besides the usual liver and kidney picture there was a markedly enlarged heart. This enlargement was due to massive infiltration of the myocardial fibres with glycogen. The relationship to idiopathic hypertrophy of the heart was discussed.

Human Convalescent Serum in the Treatment of Preparalytic Poliomyelitis. Alfred E. Fischer. Am. J. Dis. Child. 48: 481, September 1934.

Because of numerous reports which had previously appeared in the literature concerning the value of human convalescent serum in the treatment of preparalytic poliomyelitis, an attempt was made in 1931 during the New York City epidemic to thoroughly evaluate the serum by treating a number of patients and by using as many as possible for controls. Four hundred seventy-seven patients were treated and one hundred two were untreated.

It was demonstrated that the outcome for the treated cases was no better, if as good, as for the untreated ones. On the other hand, it seemed likely that judging from the temperature of the patient, cell count, and general clinical impression when first seen, the untreated group consisted of somewhat milder cases.

The results, therefore, were inconclusive, and it was suggested that it would seem fairer in subsequent epidemics to retest the value of potent human convalescent serum in the preparalytic or meningitic stage of poliomyelitis using exactly similar or alternate cases for control.

The Fate of Children of Tuberculous Families Including Those Treated and Those not Treated with BCG. C. Kereszturi, M. Levine, Wm. H. Park, and P. Vogel. Am. J. Dis. Child. 48: 507, September 1934.

For the past five years studies have been carried out to test the efficacy of induced tuberculosis produced by means of BCG vaccination. Children so treated were compared with a similar untreated control group.

The children received the BCG vaccination by the oral, subcutaneous, and intradermal routes.

In all, 435 vaccinated children were compared with 712 controls. The non-

vaccinated group showed a much higher mortality. Although the cases are too few to draw conclusions, the results are suggestive that vaccination with BCG prevents children from dying of tuberculosis.

A Surgical Approach to the Obturator Foramen. Seth Selig. J. Bone & Joint Surg. 16: 950, October 1934.

An osteochondroma of the obturator foramen is described in a woman, aged twenty-one years. Because of the unusual site of the tumor, no standard approach was available. A four inch incision was made on the posterior aspect of the thigh, perpendicular to the labia majora, with the patient in the gynecological position. The fascia was incised in the same line and the interval between the gracilis and the adductor magnus muscles presented in the wound. By blunt dissection through this space and the fibers of the obturator externus, the tumor was easily removed. No bleeding was encountered, and the patient made an uneventful recovery.

Distribution of Blood to the Prostatic Urethra—a Demonstration. Hermon C. Bumpus, Jr. and William Antopol. J. Urol. 32: 354, October 1934.

Utilizing the injection method of Dr. L. Gross, it was found that the blood distribution in the prostate gland is divided into three zones: a peripheral plexus of small arteries, an internal periurethral plexus, and an intermediate zone of parallel vessels connecting them.

The importance of this distribution in transurethral revision of the prostate is discussed.

Recurrent Laryngeal Paralysis in Left Ventricular Failure. F. H. King, W. M. Hitzig, and A. M. Fishberg. Am. J. M. Sc. 188: 691, November 1934.

Three cases of left recurrent laryngeal palsy complicating hypertensive and arteriosclerotic heart disease with left ventricular failure are described. Two of the cases were instances of coronary thrombosis.

Evidence is presented that the left recurrent laryngeal palsy was due to compression of the nerve between the left pulmonary artery, the arch of the aorta and the ductus arteriosus. The cause of the compression is regarded as dynamic dilatation of the pulmonary artery due to the engorgement of the lesser circuit engendered by the failure of the left ventricle.

It is suggested that when recurrent laryngeal paralysis complicates mitral stenosis, the dynamic dilatation due to the hypertension of the lesser circulation probably plays a significant part.

A Method for the Study of the Retinal Circulation. Robert K. Lambert. Arch. Ophth. 12: 868, December 1934.

The physiologic and pharmacologic responses of the retinal vessels are very poorly understood. In order to facilitate the study of these vessels, an apparatus for making photomicrographs in vivo was devised. The apparatus consists of a microscope with a self-contained illuminating system, such as is used for examining opaque objects, and a contact glass held over the eye to neutralize the corneal curvature. A series of photographs is taken on movie film by means of a miniature camera during the course of the experiment. This apparatus is now in use, and it is hoped that it will make possible a better understanding of the retinal circulation.

Kala Azar in Children. George J. Ginandes. Am. J. Dis. Child. 48: 1336, December 1934.

A case of successfully treated kala azar in a Greek child is reported. This is the

fourth case of the disease reported in the American literature. A clinical and pathological survey of kala azar occurring in infants is given, and its epidemiological peculiarities are discussed. The ease of diagnosis by bone-marrow puncture is stressed, and the usefulness of this procedure in investigations of diseases of the hemopoietic system and in splenomegalies of undetermined origin is urged. Specific therapy is outlined, and the need for uninterrupted treatment emphasized.

Pellagra as a Cause of Optic Neuritis. Joseph Levine. Arch. Ophth. 12: 902, December 1934.

The case reported is the first of its kind to be seen in any country outside of Italy and Russia where pellagra is fairly common amongst the peasants, and in whom optic neuritis has not been an uncommon complication.

An adult woman whose consumption of alcohol was so constant that little food was consumed. She had diarrhoea and was gloomy and depressed for several months prior to a sudden bilateral exudative optic neuritis, followed by stomatitis and dermatitis.

Vitamin B therapy, without entirely prohibiting alcohol, caused recovery within two months. Both eyes had normal vision five months after the onset of blindness.

Polycystic Disease of the Kidney. Gordon D. Oppenheimer. Ann. Surg. 100: 1136, December 1934.

This study based on a survey of 60 patients is a comprehensive summary of our present knowledge of the condition. While the disease is usually bilateral, two proved unilateral cases are described. Evidence is presented to show that the disease as seen in the newborn and in adults is the same condition. The average age at the onset of symptoms is 41.5 years while the average age at death is 50 years. Forty-three per cent of the cases are dead. The familial and hereditary nature of the disease is emphasized. The most common symptoms are loin and abdominal pain, hematuria (56 per cent), nocturia, loss in weight, vomiting and tumor mass. Laboratory evidence showed 71 per cent to have renal impairment while 57 per cent had hypertension. The clinical grouping, laboratory and post-mortem findings, relation to associated lesions, diagnosis and differential diagnosis are described. The treatment is conservative, medical. Operation should never be done except for complications as diffuse suppuration, certain calculus conditions and for other rare indications which are detailed.

Carcinoma of the Bronchus, Suppurative Pneumonitis and Bronchiectasis, Interlobar Empyema. Howard Lilienthal. Am. J. Surg. 27: 50, January 1935.

Lobectomy for secondary suppurative bronchiectasis, caused by an occluding squamous cell carcinoma of the left lower lobe bronchus an inch from the upper lobe bronchus. Empyema as complication. Patient a male, age 36 years, was septic when first seen. Operation on October 16, 1933 in avertin anesthesia with nitrous oxide and oxygen (Branower). Electric scalpel for skin and muscles only. Seventh and eighth ribs resected posteriorly through an eighth interspace incision. Two stages, eleven days apart, were necessary because of the poor condition of the patient. Amputation above the bronchial carcinoma, later proven by bronchoscopy. Patient discharged with a bronchial fistula after a gain of 20 pounds in weight.

Dangers of Acidifying Salt Therapy in Urologic Cases. Gordon D. Oppenheimer. J. Urol. 33: 22, January 1935.

Acidifying drugs and particularly ammonium chloride are often used in cases of alkaline infection of the urinary tract. Ordinary doses of these drugs given to normal individuals produce no marked effect on the acid-base equilibrium of the body.

When given, however, to a patient with slight or moderate impairment of renal function, severe symptoms of acidosis may result. Listlessness, drowsiness, and even coma may occur, and in such instances, renal insufficiency is commonly blamed when it may be no more than contributory. Two illustrative cases are presented in detail. The point is stressed that where therapeutic measures are used which are known to have possible effects on the acid-base equilibrium, careful clinical and repeated chemical observations should guide the treatment.

Functional and Nervous Disorders of the Stomach and Alimentary Tract. Burrill B. Crohn. Am. J. Digest. Dis. & Nutrition 1: 773, January 1935.

The paper deals with the recent views pertaining to gastro-intestinal neuroses. It emphasizes two possible errors in diagnosis: (1) the mistake of overlooking organic disease in a nervous patient, and (2) the common mistake of considering as organically ill, one who is emotionally disturbed. In a psychoneurosis with gastro-intestinal manifestations, the treatment is entirely personal and psychological.

Histologic Observations on the Fundus in Leukemia. Isadore Goldstein and David Wexler. Arch. Ophth. 13: 26, January 1935.

This study, consisting of a histologic examination of the eyes in eleven cases of various types of leukemia, indicates the frequency of typical and atypical lesions in general, and draws attention to certain features rarely met with in previous studies. In most instances, the retinal lesions were minimal and except for evidences of bleeding and dilatation of the retinal vessels, produced but little change in the retinal structure. In the choroid, slight overfilling of the blood vessels was the rule. In one case (acute myeloid leukemia) where the retina was soaked with blood, fragmentation and necroses of the larger vessels had occurred, as well as marked sheathing of the veins with leucocytes and exudation of large numbers of leucocytes into the retina and nerve. Such lesions must be unusual, as is the extreme dilatation of the choroid with myelocytes such as occurred in another case of acute myeloid leukemia.

Modern Treatment of Duodenal Fistula. David Warshaw. Am. J. Surg. 27: 139, January 1935.

In this article the author discusses the modern treatment of duodenal fistula by the application of fundamental physiological principles. Since trypsin, a proteolytic enzyme, is the chief offender in causing the digestion and destruction of tissue, with the formation of a sloughing crater, followed by dehydration, alkalosis, starvation and death; and since it is active only in an alkaline medium, it follows that its inactivation may be and is affected by the use of tenth normal hydrochloric acid. Witte's peptone solution is added to supply protein for any unneutralized trypsin. Details of this treatment are described in a case report, and the literature is quoted.

Thrombo-angiitis Obliterans in Women. Report of Two Cases. Samuel Silbert. Ann. of Surg. 101: 324, January 1935.

The author reports that he has seen only two women with thrombo-angiitis obliterans in over 1000 cases of this disease studied by him. The infrequency of the disease in the female has been noted by Buerger, Willy Meyer, Brown and others. The case histories of the two patients seen by the writer are briefly reported. The predominance of the condition in the Hebrew race and its occasional occurrence in brothers is cited as possible evidence of a hereditary factor in the etiology of the condition. In view of the rarity of the disease in the female, the author inclines to the belief that the constitutional factor is transmitted along sex linked lines as in hemophilia. Since the use of tobacco is also necessary to produce the disease, the condition may be latent in many individuals who do not smoke.

Association of Universal Edema of the Fetus and Congenital Anemia of the New Born. Harry D. Pasachoff and L. Wilson. Am. J. Dis. Child. 49: 411, February 1935.

As a sequel to the previous report of a case of congenital anemia of the new-born without erythroblastosis, two subsequent pregnancies in the same mother are reported, both of which resulted in premature stillborn infants with universal edema. This familial incidence offers further evidence that universal edema of the fetus and congenital anemia of the new-born are closely related disorders. Autopsy performed on one of the cases of universal edema showed no evidence of abnormal erythroblastic activity.

The view is expressed that erythroblastosis is a secondary response rather than the underlying pathologic condition in the triad of disorders consisting of universal edema of the fetus, icterus gravis neonatorum and congenital anemia of the new-born.

Bronchiogenic Cancer Combined with Tuberculosis of the Lungs. B. M. Fried. Am. J. Cancer 23: 247, February 1935.

From a study of thirteen cases of primary carcinoma of the bronchus combined with pulmonary tuberculosis, it was found that in some cases the malignant condition had developed independently from the tuberculous disease, while in others it was engrafted on an ancient fibrotic infection. The neoplastic disease did not originate in the wall of the tuberculous cavity but in an adjacent bronchus. On reaching the cavity, it lined its wall in a syncytial manner and grew in masses.

The tuberculous lesion found in the lungs of such patients was of the healing fibrotic type, being to all appearances of long standing.

Most of the patients had had a history of cough extending over a number of years. In five of the thirteen cases a correct diagnosis was made in other institutions but had not been suspected by the private physicians who attended the patients for some time prior to hospitalization. Eight of the patients were admitted to the hospital without a diagnosis or with one of tuberculosis of the lungs. In three patients spontaneous pneumothorax occurred on the side affected by the malignant disease.

It is pointed out that in any instance of chronic pulmonary disease in a person of middle or past middle age, with persistence of symptoms, accompanied by a progressive loss of weight and strength, the possibility of malignant disease should always be considered. The presence of pulmonary tuberculosis does not exclude the existence of a malignancy in the same lung.

Circulation Time in Normal Children. Samuel H. Averbuck and William Friedman. Am. J. Dis. Child. 49: 361, February 1935.

With the use of the saccharin method, the circulation time was determined in 100 normal children ranging in age from eight to sixteen years. The technic employed is described. The average circulation time was 8.6 seconds. The range was from 5 to 13.5 seconds. In 83 of 100 tests, the limits were from 6.5 to 10 seconds. This is shorter than the circulation time in adults, determined either by the saccharin or the sodium dehydrocholate method.

The circulation time in children as determined by this test is controlled probably by two factors: first, the actual distance to be traversed from the arm to the tongue (it is less than that in adults); second, the execution of the test in children induces excitement and an acceleration of the heart rate.

Coincident Scirrhous Lesions of the Stomach and Colon. Marcy L. Sussman. Am. J. Roentgenol. & Radium Therapy 33: 205, February 1935.

Two cases showing coincident scirrhous lesions of the stomach and colon are

described. One was proved by operation and microscopic examination to be a scirrhous carcinoma of the stomach with metastases to the large bowel. It is emphasized that in a case where multiple constrictions in the colon are found during a barium enema examination, a barium meal examination should be made, first, to confirm these findings and secondly to determine whether or not a scirrhous lesion is also present in the stomach. Coincidence of such lesions is highly suggestive of scirrhous carcinoma of the stomach with metastases to the large bowel.

Five Year Cures of Cancer of the Stomach. Richard Lewisohn and Sigmund Mage. Surg. Gynec. & Obst. 60: 467, February 1935.

Surgery offers the only therapeutic outlook in carcinoma of the stomach. Twenty per cent of the cases surviving radical operation have remained well five years or longer. The number of prolonged arrests are small in relation to the total incidence of the disease. Only 40 per cent of cases come to surgical exploration and of these only 35 per cent are resectable. Improvement in results depends upon early detection of the disease, early exploration and adequate surgery. X-ray examination is the most dependable aid for early diagnosis. Five year survivals establish the value of radical surgery and disprove common conceptions concerning the prognosis of carcinoma of the stomach.

Metastasis in the Choroid from Adenocarcinoma of the Testis. Isadore Goldstein and David Wexler. Arch. Ophth. 13: 207, February 1935.

This case differs from other metastatic choroidal growths in that the primary tumor was an adenocarcinoma of the testis. In this patient, aged four, orchidectomy had been done eighteen months before. The first sign of ocular involvement was redness of the conjunctiva in the right eye. Detachment of the retina by a solid growth was discovered on ophthalmoscopic examination. In sections the unusual features were the situation of the tumor in the tissue between the choroid and sclera and the enlargement of the globe. In explanation of this enlargement were the rapid growth of the tumor and the influence of necrotic tumor tissue in causing the sclera to stretch.

"Parametrial Fixation" (Manchester Operation) for Prolapse of the Uterus. Robert T. Frank. Am. J. Obst. & Gynec. 29: 240, February 1935.

The operation described was initiated in 1888 by Donald of Manchester. It has been extensively practiced in England. The present article describes the technic as developed by the author at The Mount Sinai Hospital. It is applicable to every case of descensus of the uterus in which the cervix can be pulled to the introitus. When the anatomy is understood, the procedure is readily taught even to the intern staff, so that uniform and good results are obtained. Over 100 operations have now been performed with a follow-up extending three years. Recurrence of prolapse are less than 1 per cent. The successful repair of the anterior vaginal wall (cystocele) depends on the care exercised in this portion of the operation as well as the strength of the anterior tissues.

Simultaneous Closure of all the Central Retinal Vessels. Morris B. Bender. Am. J. Ophth. 18: 148, February 1935.

A case of bilateral central retinal artery and vein occlusion is described, its onset immediately consequent upon a tooth extraction. The initial symptoms consisted of headache, diplopia, transient blurring of vision with flashes of red and green lights. Within 36 hours there developed amaurosis. The fundi showed blurred disc outlines with profuse hemorrhages, exudates and edema throughout the retina. A bilateral mild uveitis appeared at the end of the second day. The course was char-

acterized by pains and aches in various parts of the body and a septic temperature which lasted three weeks. The general physical examination and repeated blood cultures were negative. Five weeks later the patient was still amaurotic; the fundi revealed occlusion of the central retinal artery and vein with evidences of old hemorrhages and exudates in both eyes. Several etiologic possibilities without definite conclusions are offered.

Vegetative Disturbances of Cerebral Origin. Joseph H. Globus. New York State J. M. 35: 1, February 1935.

The term "vegetative nervous system" is defined. Its cerebral (diencephalic) representation is described. The relation of the diencephalic vegetative centers to the autonomic system is discussed. Illustrative cases displaying several constellations of vegetative dysfunctions are reported. In the concluding remarks it is pointed out that in all of the reported cases the diagnosis of a lesion in the diencephalo-hypophyseal region was made clinically. In arriving at a diagnosis, the neurologic findings pointing to a disease process in the interpeduncular space and roentgenologic demonstration of calcific bodies in the vicinity of the sella turcica were important guides, but the presence of vegetative dysfunctions was a determining factor. The anatomical studies of the material presented seem to substantiate the views held with regard to the hypothalamus, that it serves as an important center controlling the interacting vegetative functions.

Birth Control; Creation vs. Propagation. Ira S. Wile. Am. Med. 41: 141, March 1935.

The birth rate is declining throughout the world. This is not a theory as can be seen by the falling birth rates in the various countries of the world. The United States has shown a sharper decline than that found in most countries, but the striking fact is that the decline has been noted most amongst the families economically more capable of supporting children. Birth control clinics throughout the country have increased considerably in number which reflects a strong social demand. In spite of Section 211 of the United States Penal Code which prohibits sending or receiving information or supplies for contraceptive purposes, such material is readily obtainable. Physicians have hesitated to voice their opinion in this matter though they frequently violate the rules in private practice. Occasionally medical societies have dared to pass resolutions concerning contraception and contraceptives. No group in the community is more sensitive to its right or more insistent in its claims to intellectual leadership than the medical profession; still it is hesitant to assume the constructive leadership until the laity has already made rapid advance in this direction.

Social and economic changes have been responsible for the increased strength of contraceptive thinking and regardless of protestations to the contrary the idea of birth control is being more and more crystallized.

Effect of Mocassin Snake Venom (Ancistrodon Piscivorus) in Hemorrhagic Conditions. S. M. Peck and N. Rosenthal. J. A. M. A. 104: 1066, March 1935.

The administration of mocassin snake venom (Ancistrodon piscivorus) intracutaneously or subcutaneously (from 0.2 to 1. c.c. of a 1:3000 solution) is effective in controlling various hemorrhagic conditions unassociated with blood changes. In thrombocytopenic purpura haemorrhagica, it seems to be effective in some cases and ineffective in others. It is of no value in cases of congenital hemophilia.

Lesions of the Coronary Arteries and their Branches in Rheumatic Fever. L. Gross, M. A. Kugel, and E. Z. Epstein. Am. J. Path. 11: 253, March 1935.

A description is presented of the vascular lesions in the main coronary arteries and their branches as they occur in 66 cases of active rheumatic fever and in 34 cases of inactive rheumatic fever. A statistical study is made of the frequency with which these lesions occur and of their sites of predilection. These are compared with the findings in normal control cases. The lesions in the myocardial branches have been classified under a number of different headings. Four of these are similar to the evolutionary age period changes found in normal control cases. Several of the remaining lesions are so peculiar in their structure as to suggest the possibility that they may be specific of rheumatic fever. This conclusion, however, cannot be accepted as final without an extensive search for similar lesions in other affections of the myocardium.

A discussion is given of the mechanism concerned in the development of these lesions, of their possible relation to the development of the arteriosclerotic process and of their clinical significance.

Low Basal Metabolic Rates Obtained by Low Calorie Diets in Coronary Artery Disease. A. M. Master, H. L. Jaffe, and S. Dack. Proc. Soc. Exper. Biol. & Med. 32: 779, March 1935.

Because diminished food intake is known to lower basal metabolism and thus to retard the blood flow and decrease the work of the heart, it seemed desirable to determine the basal metabolism in patients with coronary thrombosis or sclerosis on a balanced 800 calorie diet (carbohydrate 80 grams; protein 50 grams; fat 30 grams). Readings were made frequently, controls being obtained at the onset or after increasing the diet. Eight patients were studied, four of them for three or more months. After two to four weeks, the patient being in or out of bed, the basal metabolism rate varied between -20 and -30, and rose when the diet was increased, reaching normal in $1\frac{1}{2}$ to $2\frac{1}{2}$ weeks. This régime, therefore, achieves for a time results comparable to those of complete thyroidectomy.

Peptic Esophagitis: A New Clinical Entity. Asher Winkelstein. J. A. M. A. 104: 906, March 1935.

A group of elderly male patients with symptoms strongly suggesting carcinoma of the lower esophagus. However, the course of the disease and the biopsy findings excluded that diagnosis. Because of the location, the constant association with gastric or duodenal ulcer and hyperchlorhydria, and its response to ulcer therapy, the disease is considered "peptic" esophagitis. Severe chronic heartburn may be due to peptic esophagitis. This new clinical entity is important in the differential diagnosis, especially of carcinoma of the esophagus.

The Causes of Death after Urological Operations. A. Hyman and W. H. Mencher. J. Urol. 33: 315, March 1935.

A study based upon 168 cases with 119 autopsies indicates that infection plays the major rôle (54 per cent) in causing death (wound infections, peritonitis, kidney infection, sepsis). Other important causes are pneumonia 6.5 per cent, shock 6.5 per cent, pulmonary embolism 5.3 per cent, hemorrhage 4.1 per cent and cerebral complications 1.7 per cent.

The authors emphasize free drainage and protection of the peri- and retrovesical region in all bladder operations; protection of the peritoneum and immediate suture of all rents in this lining, careful aseptic technique during the irrigation of an organ through urethral and ureteral catheters, hemostasis, avoidance of excessive fulguration and radiation of infected organs, proper choice of anesthesia and multiple stage operations in debilitated patients.

Cardiac Output and Related Functions under Basal and Postprandial Conditions. Sidney A. Gladstone. Arch. Int. Med. 55: 533, April 1935.

Forty-four determinations of the cardiac output by means of the foreign gas (Marshall-Grollman acetylene) method in 5 normal and 7 abnormal subjects demonstrated an average increase of 25 per cent in the normal group and 17 per cent in the abnormal group during digestion as compared with the fasting state. A source of error in the method of gas analysis as originally described is discussed, and a corrective procedure is suggested. Changes in blood pressure and pulse rate as an indicator of relative changes in systolic and cardiac output are found to possess limited usefulness.

Latent Cardiac Complications Following Sydenham's Chorea. Herman Schwarz and Sidney D. Leader. Am. J. Dis. Child. 49: 952, April 1935.

Seventy-five cases of so called "pure" Sydenham's chorea were observed for from one to twelve years for evidence of cardiac involvement. The term "pure" chorea was used for the cases of chorea in which no other manifestations of rheumatism were noted clinically. Most of these children developed some cardiac involvement, the most constant physical sign being a systolic murmur of marked persistence at the apex. The longer the period of observation after the first attack of chorea, the higher was the percentage of cardiac involvement found. Roentgenographic evidence of cardiac lesions were remarkably constant and corresponded well with the physical findings; occasionally positive roentgenographic evidence was found in cases with physical findings of no significance.

Parathyroidectomy for Raynaud's Disease and Scleroderma. Alice R. Bernheim and John H. Garlock. Ann. Surg. 101: 1012, April 1935.

On the theory that most patients with vasospastic diseases have been on a low calcium intake for a number of years before the development of symptoms, the authors have treated a large number of patients by the administration of a high calcium-high vitamin diet with marked alleviation of symptoms due, primarily, to vasospasm. A small number have resisted such treatment. It was therefore assumed that changes of a more or less permanent nature had taken place in the parathyroid glands because of the excessive demands made upon these glands to maintain a normal serum calcium level during the period of calcium starvation. Accordingly, six patients, some with pure Raynaud's disease, the remainder with associated scleroderma, were subjected to removal of two and a half parathyroids. The cases are reported in detail. The results so far have been promising.

Prevention of Poliomyelitis in Monkeys by Means of Hyperpyrexia. Heinrich F. Wolf. Proc. Soc. Exp. Biol. & Med. 32: 1083, April 1935.

The author treated with hyperpyrexia five rhesus monkeys which were infected with five to ten times the infective dose. Four of these received three to four treatments from the day following inoculation and showed no or only slight transitory signs of paralysis, while the control monkeys became paralyzed within five to nine days. One monkey which was inoculated with five infective doses and which received two treatments only, the treatment having to be discontinued on account of diarrhea, became paralyzed on the fourteenth day while the control became paralyzed on the seventh day. The experiments are being continued to study the effect of hyperpyrexia in the preparalytic stage.

The Psychogenic Origin of Organic Diseases. Eli Moschcowitz. New England J. Med. 212: 603, April 1935.

1. The following diseases of organic nature are discussed because they are re-

garded as psychogenic in origin. a. The vast majority of cases of essential hypertension. b. Graves' syndrome. c. Gastric and duodenal ulcer. d. Cardiospasm. e. Irritable or spastic colon and mucous colitis.

2. In the evaluation of the psychogenic factors two elements must be considered; first, the underlying personality or constitution which as a general rule is phenotypic; and secondly, the exciting factor which is in the nature of an emotional insult or conflict.

3. There are three factors (stages) in the evolution of the organic disease; first, the constitution; secondly, the fixation of an exaggerated function of organ or organs affected; and thirdly, the development of the lesion.

4. While the personality type varies in these different diseases there is considerable overlapping in relation to the reaction of the individual to strain and conflict. The emotional crises are not distinctive. Why one organ should be more affected in one individual than the other is not clear.

5. These maladies are distinguished by five characteristic features.

a. From the physiological point of view they represent exaggerations of normal function.

b. They are essentially human diseases and with doubtful exceptions they cannot be produced experimentally in the lower animals.

c. They rarely occur before the emotive and affective powers are fully developed, i.e., before puberty.

d. Their life cycle is characterized by a great tendency to recurrence.

e. Their incidence bears a strong relation to world crises or great emotional waves.

6. Psychotherapy is an important element in the treatment of these maladies; obviously its value is largely prophylactic.

INDEX OF VOLUME TWO

The (*) preceding the page number indicates an original article; the letters "ab" similarly placed indicate an abstract; "cp" signifies a clinical pathological conference report. Author entries are made only for original articles. Obituaries are indexed under this heading in alphabetical order under the letter "O." Book reviews are entered in alphabetical order under the letter "B."

ABDOMINAL wounds, disruption of, [ab]90
Abscess, cerebellar, recurrent, *267
of liver, amoebic, *259, multiple pylephlebitic, [cp]239
Adenoma of trachea, benign, *30
Adenosine, effect of, on cardiac irregularities, [ab]88
Allen, Benjamin, otitic cavernous sinus phlebitis due to bacillus Friedlander, *169
Allergy, quinine and ergot, [ab]189
Amoebic abscess of liver, *259
Amyloidosis, primary, *14
Aneurysm and thrombosis of left coronary artery with aneurysms of left ventricle and interventricular septum, *26
Angioneurotic edema, psychogenic factors in, *231
Antuitrin-S injection on immature ovary, [ab]90
Anxiety as medical problem, [ab]91
Appendicitis, acute, lowered mortality in, [ab]192
multiple pylephlebitic liver abscesses following, [cp]239
Arnheim, Ernest E., regional ileitis with perforation, abscess, and peritonitis, *61
Arsenical polyneuritis, *33
Arsphenamine, pericapillary encephalorrhagia due to, [ab]88
Arterial blood vascular distribution to left and right ventricles of human heart, [ab]89
Arteritis, necrotizing, [cp]288
Arthritis and catarrhal jaundice, *228
chronic, sinusitis in, [ab]89
Aschoff body, myocardial, [ab]191
Auslander, Jacob, see Goldberger, *209
Avertin (tribromethanol) anesthesia in normal persons, [ab]191

BACILLUS Friedlander, otitic cavernous sinus phlebitis due to, *169
proteus osteomyelitis of spine, [ab]90
Bacterial endocarditis, *109, *153
Beck, David, Hodgkin's disease with bilateral obstructive pyelonephritis due to infiltration of ureters, *126
Beer, Edwin, non-traumatic perforations of upper urinary tract, *1
Bender, Morris B., arsenical polyneuritis of trunk and extremities, *33
Bender, Morris S., bilateral vocal cord paralysis due to syphilis, *72
Berck, Maurice M., mediastinotomy for acute suppurative mediastinitis, *174
Bernstein, Phineas, ovarian carcinomata simulating acute surgical conditions of abdomen, *160
Bernstein, Solon S., diabetes insipidus and hysterical polyuria, *178
Blood, distribution of, to prostatic urethra, [ab]293
Boas, Ernst P., spontaneous variations in ventricular rate in complete heart block, *95
Book reviews, Abramson, Harold A., Electrokinetic Phenomena and Their Application to Biology and Medicine, 291
Beer, Edwin, Tumors of the Urinary Bladder, 291
Brachial artery, embolism of, *103
Bronchus, carcinoma of, [ab]294, and pulmonary tuberculosis, [cp]283
Bukantz, Samuel C., see Friedberg, *109

CALCINOSIS, parathyroid hyperplasia and, *270
Carcinogenesis, [ab]91
Carcinoma of bronchus, [ab]294, and pulmonary tuberculosis, [cp]283
of stomach, unsuspected, *22
Carcinomata, ovarian, *160
Carcinosis of lungs, lymphangitic, *246
Cavernous sinus phlebitis, otitic, *169
thrombosis, *121
Cerebellar abscess, recurrent, *267
Cerebral complications of putrid pleuropulmonary suppuration, [ab]191
embolism of pulmonary origin, [ab]48
Cervical vertebrae, dislocation of, [ab]92
Cholangitis, ascending, [cp]240
Cholecystitis, acute, [ab]190
Choledochus stone, *68
Cholesteatoma of occipital bone, primary, *56
Chorioepithelioma, ectopic, *135

Cinchophen, arthritis and catarrhal jaundice, *228
Circulation, retinal, [ab]293
time from antecubital vein to pulmonary capillaries, [ab]93
Cohen, Ira, benign spinal cord tumor in suspected malignancy, *116
Colon, ascending, stricture of, *217
Conference, clinical pathological, October 9, 1935, [cp]239
November 6, 1935, [cp]282
Coronary arteries and their branches in human heart, [ab]91
artery occlusion, acute, with perforation of interventricular septum, *182
thrombosis: perforation of infarcted intraventricular septum, [ab]89
Cutaneous manifestations of endocrine disorders, [ab]88

DACK, Simon, nodal bigeminy; observations on dynamics of nodal extrasystoles, *201
Dantes, D. Alfred, periarteritis nodosa, *130
Denzer, Bernard S., see Karelitz, *6
Depersonalization in relation to erotization of thought, [ab]146
Diabetes insipidus, *178
Diaphragmatic hernia, *44
Doubilet, Henry, choledochus stone, *68
Druss, Joseph G., multiple intracranial complications following apparently cured case of acute mastoiditis, *224
Duodenal fistula, [ab]295
Dystrophia myotonica, [ab]48

ECTOPIC chorioepithelioma, *135

Eczema of infancy and childhood, [ab]48
Edema, angioneurotic, *231
Electrocardiographic evidence of cardiac involvement in acute disease, [ab]93
Eliasoph, Benjamin, aneurysm and thrombosis of left coronary artery with aneurysms of left ventricle and interventricular septum, *26
Embolism of brachial artery, *103
cerebral, of pulmonary origin, [ab]48
Encephalorrhagia, pericapillary, [ab]88
Endocarditis, bacterial, *109, *153
Endocrine diagnosis and therapy, [ab]194
disorders, cutaneous manifestations of, [ab]88
Enzymes, lipolytic, [ab]146
Ergot and quinine allergy, [ab]189
Erotization of thought, [ab]146
Exophthalmic goiter, recession of levator for lagophthalmos in, [ab]92

FIBROMA of pleura, *38

Fibro-xanthoma of presacral connective tissue, *49
Foreign body (fish bone) perforation of transverse colon, multiple pylephlebitic liver abscesses following, [cp]239
Friedberg, Charles K., bacterial endocarditis due to gram-negative coccobacillus of undetermined identity, *109

GEIST, Samuel H., fibro-xanthoma of presacral connective tissue, *49
Gerber, I. E., ectopic chorioepithelioma, *135
von Gierke's disease, [ab]292
Ginandes, George J., lead poisoning in children, *74
Ginsburg, Sol W., acute aseptic meningitis, *165
Globulin extract of immune adult serum in prophylaxis of measles, [ab]92
Glomerulonephritis, subacute, with decapsulation, [cp]285
with necrotizing arteritis of liver and pancreas, [cp]288
with severe extrarenal vascular lesions, [cp]287
Glycogen storage, abnormal, in von Gierke's disease, [ab]292
Goiter, retrotracheal and retroesophageal, *195
Goldberger, Morris A., lymphogranuloma venereum, *209
Goldman, Joseph L., cavernous sinus thrombosis following intranasal infections, *121
Gonococcemia with recovery, [ab]192
Gross, Louis, see Friedberg, *109

HAGELSHAW, Gayland L., diaphragmatic hernia, *44
Head injury, neurologic and psychiatric aspects, [ab]189
Heart, arterial blood vascular distribution to, [ab]89
block, spontaneous variations in ventricular rate in, *95
enlargement of, due to abnormal glycogen storage in von Gierke's disease, [ab]292
histology of coronary arteries in, [ab]91
Hemangioendothelioma, epidural, *641
Hennell, Herman, benign adenoma of trachea (at the bifurcation), *30
Hernia, diaphragmatic, *44
hiatus, *263
Hodgkin's disease, *126
intrathoracic, *251
Hyperplasia, parathyroid, *270
Hysterical polyuria, *178

ILEITIS, regional, *61
Intracranial complications, multiple, following apparently cured case of mastoiditis, *224
involvement, in primary jugular bulb thrombosis, *243

JAFFE, H. L., see Master, *182
Jaundice, catarrhal, arthritis and, *228
Jugular bulb thrombosis, primary, *243

KALA azar in children, [ab]293
Kaplan, Abraham, epidural hemangioendothelioma, *64
Karelitz, Samuel, lipoid pneumonia, *6
Kidney, polycystic disease of, [ab]294
Klein, Samuel H., stricture of ascending colon, *217
Kuttner-Lichtenstein microcolorimetric method for determination of organic phosphorus, [ab]190

LABYRINTHITIS, acute, with meningitis sympathica, *11
Lagophthalmos in exophthalmic goiter, [ab]92
Laryngitis, acute phlegmonous, mediastinitis and confluent bronchopneumonia, [cp]282
Lead poisoning in children, *74
Leukemia, histologic observations on fundus in, [ab]295
myelogenous, periosteal ossification in, [ab]190
Lewisohn, Richard, retrotracheal and retroesophageal goiter, *195
Lipoid nephrosis, chronic, [cp]241
pneumonia, *6
Lipolytic enzymes, [ab]146
Liver abscesses, multiple pylephlebitic, [cp]239
amoebic abscess of, *259
and pancreas, necrotizing arteritis of, [cp]288
Lorand, Sandor, psychogenic factors in case of angioneurotic edema, *231
Lungs, lymphangitic carcinosis of, tachypnoea caused by, *246
Lupus erythematosis and tuberculosis, [ab]88
Lymphogranuloma venereum, *209

MALARIA, congenital, *147
Master, A. M., acute coronary artery occlusion with perforation of interventricular septum, *182
Mastoiditis, acute, *224
Maybaum, Jacob L., acute labyrinthitis with meningitis sympathica; labyrinthectomy; recovery, *11
primary jugular bulb thrombosis; postoperative symptoms of intracranial involvement, *243
Measles, prophylaxis of, [ab]92
Mediastinitis, [cp]282
acute suppurative, mediastinotomy for, *174
Melanoma to groin, metastasis of, [ab]92
Mencher, William H., amoebic abscess of liver, *259
unsuspected carcinoma of stomach, *22
Meningitis, acute aseptic, *165
sympathica, *11
Mintz, Nathan, fibroma of pleura, *38
Mond, Hermann, see Dack, *201
Moschcowitz, Eli, hiatus hernia, *263
primary amyloidosis, *14
Muscle sarcoma, skeletal, [ab]94
Myelitic and myelopathic lesions, [ab]47
Myocardial Aschoff body, [ab]191

NEPHROSIS, chronic lipoid, thrombotic occlusion of inferior vena cava and tributaries, associated with, [cp]241
Nodal bigeminy, *201

OBESITY in children, treatment of, [ab]90
Obituaries
Cohen, John *280
Klingenstein, Charles, *281
Mond, Hermann, *237
Nathan, Philip William, *187
Sass, Leon Irving, *188
Obturator foramen, surgical approach to, [ab]293
Oppenheimer, Gordon D., tuberculin as diagnostic aid in renal tuberculosis, *52
Osteoarthritis, pathogenesis of, [ab]193
Osteochrondrofibro-sarcomatosis, tumor of orbit in, [ab]194
Osteomyelitis of spine, [ab]90
Ovarian carcinomata, *160

PAIN, individual sensitiveness to, [ab]91
Paralysis, bilateral vocal cord, *72
recurrent laryngeal, [ab]293
Parathyroid hyperplasia and calcinosis, *270
Pellagra as cause of optic neuritis, [ab]294
Perforation, abscess, and peritonitis, regional ileitis with, *61
of interventricular septum, *182
of upper urinary tract, non-traumatic, *1
Periarteritis nodosa, *130
(necrotizing arteritis) associated with rheumatic heart disease, [ab]193
Pericapillary encephalorrhagia due to arsphenamine, [ab]88
Pleura, fibroma of, *38
Pneumonia, lipoid, *6
Poliomyelitis, preparalytic, [ab]292
Pollack, Herbert, parathyroid hyperplasia and calcinosis associated with renal disease, *270
Polyneuritis, arsenical, *33
Portal vein, purulent thrombophlebitis of, [cp]240
Precordial lead in 104 normal adults, [ab]93
Presacral connective tissue, fibro-xanthoma of, *49
Priapism of psychogenic origin, [ab]191
Psychogenic factors in angioneurotic edema, *231
Psychology of the inventor, [ab]89

Pulmonary embolization and acute coronary thrombosis, [ab]92
Pyelonephritis, bilateral obstructive, *126

QUININE and ergot allergy, [ab]189

RABIN, Coleman Berley, tachypnoea caused by lymphangitic carcinosis of lung, *246
Recurrent laryngeal paralysis in left ventricular failure, [ab]293
Regional ileitis, *61
Reider, Norman, recurrent cerebellar abscess of nine years duration, *267
Renal disease, parathyroid hyperplasia and calcinosis, associated with, *270
tuberculosis, tuberculin as diagnostic aid in, *52
Retinal circulation, [ab]293
Rheumatic heart disease, periarteritis nodosa associated with, [ab]193
Roentgen evidence of preëxistent scurvy, *143
Rosenwasser, Harry, primary cholesteatoma of occipital bone, *56

SAGER, Robert V., arthritis and catarrhal jaundice, with note on relation to cinchophen, *228
Sarcoma, skeletal muscle, [ab]94
Schein, Albert J., embolism of brachial artery, *103
Schick, Bela, congenital malaria, *147
Schiller, Israel A., bacterial endocarditis with clinical picture of "ball-valve thrombus" of left auricle, *153
Schwannoma of sacral plexus, cystic, [ab]92
Scurvy, preëxistent, roentgen evidence of, *143
Sensitiveness to pain, [ab]91
Serum, human convalescent, in treatment of preparalytic poliomyelitis, [ab]292
Sherman, E. David, intrathoracic Hodgkin's disease, *251
Siegal, Sheppard, see Pollack, *270
Silver, Henry, xanthoma tuberosum multiplex, *17
Sinus, cavernous, thrombosis, *121
phlebitis, *169
Sinusitis in chronic arthritis, [ab]89
Skeletal muscle sarcoma, [ab]94
Spinal cord tumor in suspected malignancy, *116
Stein, Martin, see Schick, *147
Steinberg, Morris F., roentgen evidence of preëxistent scurvy, *143
Stomach, functional and nervous disorders of, [ab]295
unsuspected carcinoma of, *22
Stone, choledochus, *68
Stricture of ascending colon, *217
Sugar tolerance in siblings of juvenile diabetic patients, [ab]192
Sussman, Marcy L., see Steinberg, *143
Syphilis, bilateral vocal cord paralysis due to, *72

THROMBO-ANGIITIS obliterans, [ab]295
Thrombocytopenic purpura, [ab]189
Thrombophlebitis, purulent, of portal vein, [cp]240
Thrombosis, acute coronary, differentiation from pulmonary embolization, [ab]92
cavernous sinus, *121
left coronary artery, *26
primary jugular bulb, *243
Thrombotic occlusion of inferior vena cava and tributaries, [cp]241
Thrombus, ball-valve, of left auricle, *153
Trachea, benign adenoma of, *30
Trichomonas vaginalis in pregnancy, [ab]93
Tuberculin as diagnostic aid in renal tuberculosis, *52
Tuberculosis and lupus erythematosis, [ab]88
pulmonary, carcinoma of bronchus and, [cp]283
Tuberculous families, children of, treated and untreated with BCG, [ab]292
Tumor of orbit in case of osteochondrofibro-sarcomatosis, [ab]194

URETHRA, prostatic, distribution of blood to, [ab]293
Urinary tract, upper, non-traumatic perforations of, *1
Urologic cases, acidifying salt therapy in, [ab]294

VASCULAR lesions, severe extrarenal, subacute glomerulonephritis with, [cp]287
Vena cava, inferior, occlusion of, [cp]241
Ventricular rate, variations in, in complete heart block, *95
Vertebrae, cervical, dislocation of, [ab]92
Vocal cord paralysis, bilateral, *72

WOUNDS, abdominal, disruption of, [ab]90

XANTHOMA tuberosum multiplex, *17

VOLUME III MAY-JUNE, 1936 NUMBER 1

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

ENTERIC INTUSSUSCEPTION DUE TO THE INVAGINATION OF MECKEL'S DIVERTICULUM

PERCY KLINGENSTEIN, M.D.

[*Surgical Service of Dr. Richard Lewisohn*]

CASE REPORT

History (H. N. 373216). A seven year old boy was admitted to the Surgical Service on two separate occasions. Seven hours before his first admission he was suddenly seized with severe periumbilical, colicky pain. The pain did not radiate and recurred in attacks lasting about thirty seconds to several minutes at ten to fifteen minute intervals. Vomiting occurred three times, the first emesis two hours after the onset of his illness. It was not projectile and consisted of normal gastric contents. The last natural bowel movement was two days before admission, but the child usually had only one bowel movement every two days. No cathartics had been given. There had been no fever or chills. For a few days prior to admission the patient had had a slight rhinorrhea and for twelve hours a mild, non-productive cough. The patient had never been seriously ill previously.

Physical Examination. The patient was a well-developed and well-nourished, white, male child. He was distressed by intermittent spasms of severe abdominal pain, causing him to cry out. During the episodes of acute pain the abdomen was held involuntarily rigid and was diffusely tender. The blood count was normal.

Course. The morning following admission the child was free of spontaneous pain; the abdomen was soft, and because of the presence of a slight pharyngitis, it was thought that the patient was suffering from an enterospasm. He was observed for a period of five days, and as he remained completely asymptomatic, he was discharged with an equivocal diagnosis of abdominal pain of undetermined etiology.

He continued to do well for the next two weeks. At the end of this time severe periumbilical pain and vomiting recurred suddenly and continued for a period of twelve hours. The pain was persistent, non-radiating, and the vomiting had been continuous at this time. An enema was only partially effectual. There was no pyrexia.

Physical Examination on Second Admission. The child was quiet and

not complaining of pain. The abdomen was soft, and there was no tenderness over McBurney's point or rebound tenderness. No masses could be felt. There was no history of melena, and rectal examination was negative. There were 14,000 white blood cells of which 90 per cent were polymorphonuclear leucocytes and 10 per cent lymphocytes. An acute appendicitis was suspected, and the patient was operated upon.



FIG. 1. Semidiagrammatic sketch showing condition found at operation with the inverted Meckel's diverticulum forming the apex of the enteric intussusception.

Operation. Under general anesthesia the abdomen was explored through a Kammerer incision. The cecum was lifted up; the appendix was delivered into the wound and the surface found to be moderately inflamed. There was a large amount of clear serous fluid in the peritoneal cavity, which was evacuated. The appendiceal lesion did not seem to account for the large amount of clear fluid. The appendix was

removed preliminarily and the abdomen further explored. The terminal ileum was palpated and found to be the seat of an intussusception extending for a distance of five inches into the ascending colon. By very careful manipulation the intussusception was reduced, fully fifteen inches of the small bowel being invaginated. The serosa was discolored. After reduction it was noted that a small tumefaction still existed at the region of the apex of the intussuscipiens which, when pressed upon, resulted in the extrusion of what was immediately recognized as an intussuscepted Meckel's diverticulum (Fig. 1). This was situated on the antimesenteric border of the ileum at a distance of approximately sixteen inches from the il-



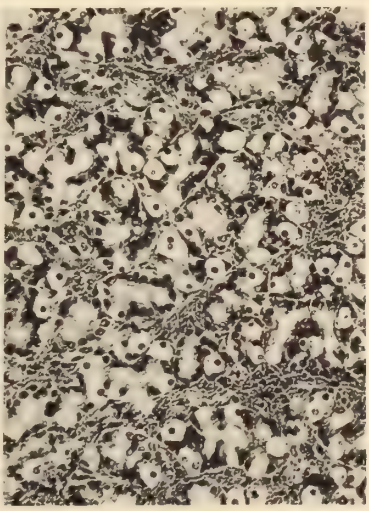


FIG. 2 FIG. 3

FIG. 2. Low power photomicrograph showing the excised Meckel's diverticulum lined by gastric mucosa.

FIG. 3. High power photomicrograph showing gastric glands in the mucosa of Meckel's diverticulum.

cocecal junction. The diverticulum was excised after clamps were applied and the resulting ileal defect closed with two layers of chromic catgut, the first a continuous one, the second interrupted. The resection of the diverticulum was carried out because of the acute inflammatory reaction which was caused by its intussusception and in order to obviate recurrence. The abdomen was closed in layers without drainage. The patient made an uneventful recovery and was discharged sixteen days after operation. The patient has since been seen in the Follow-Up Clinic and was found to be perfectly well.

Pathological Examination. The surgical specimen consisted of a portion of the small intestine. It measured $3\frac{1}{2}$ by 3 by $\frac{1}{2}$ cm. Its external

surface was smooth and glistening and somewhat edematous. The mucosal surface was colored a dark red-black and purple. Microscopic examination revealed a hemorrhagic Meckel's diverticulum with gastric mucosa lining it (Figs. 2 and 3). The appendix was found to be chronically inflamed.

COMMENT

Meckel's diverticulum is the most frequently encountered congenital anomaly of the gastro-intestinal tract occurring in about 2 per cent of individuals examined at autopsy. This structure is a remnant of the vitello-intestinal or omphalomesenteric duct which forms the connection between the primitive alimentary canal and the yolk sac in early embryonal life. Various anomalies may occur if the omphalomesenteric duct remains patent in whole or in part. It may remain as a complete pervious fistula or only the distal portion may fail to close in which case a mucus-secreting fistula at the umbilicus will result. If the mid-portion remains unobliterated, an enterocystoma is formed, which may be situated in the terminal ileum. If the luminal epithelium disappears leaving the mesodermal covering, a fibrous cord passing from the ileum or unobliterated apex of the diverticulum to the umbilicus remains which predisposes to intestinal obstruction by angulation, torsion or volvulus of the small bowel in or around the strand-like tissue. The most commonly encountered condition, however, is where only the proximal portion of the tract remains, resulting in a diverticulum which arises from the ileum and, depending upon the age of the individual, is variously spaced from the ileocecal junction: nearer the cecum in infants and further removed in adolescents and adults on account of the increased length of the intestines. The pouch varies in length, the base arising from the antimesenteric border of the ileum. Normally the structure of the pouch resembles that of the ileum. Not infrequently gastric mucosa (1) comprises the whole or part of the mucous lining of the diverticulum, and sometimes ulceration of the peptic type occurs either in the diverticulum itself or in the adjacent ileum. The distal end of the pouch may be free or attached by a fibrous band to the navel. The diverticulum may have a well-defined mesentery on its concave surface.

The various anatomical states previously enumerated may give rise to a variety of clinical and pathological conditions as have been listed by Hudson (2): (a) Gastric mucosa without perforation but with hemorrhage; gastric mucosa with perforation with or without hemorrhage. (b) Intussusception. (c) Diverticulitis. (d) Obstruction. (e) Umbilical fistula. (f) Neoplasm. (g) Enterocystomata. (h) Duplex ileum. (i) Mesenteric cyst. (j) Tuberculosis.

The operative findings in the case herein detailed correspond to the second of these pathological entities and furnish the basis of this report.

Meckel's diverticulum as a direct or indirect cause of intussusception is not common. Harkins (3) in 1933 was able to find only 160 cases reported in the literature. The specimen of the earliest known case was placed in the St. Bartholomew's Hospital Anatomical Museum in 1846. To this number he added two cases encountered at the University of Chicago Clinic.

It is estimated that Meckel's diverticulum is a factor in about 1 per cent of intussusceptions. In an analysis of 114 cases of the group collected by Harkins in which the data was sufficiently complete to permit of this, he found that the age incidence of this form of intussusception does not correspond at all with that of intussusception as a whole, but rather corresponds with the age incidence of enteric intussusception, which is found to be much higher than the ileocecal and ileocolic types more commonly encountered in infants. Hertzler and Gibson (4) found the average age incidence in their 40 collected cases to be 13 years. The patient herein detailed was a seven year old boy. Since the preponderance of intussusceptions and of Meckel's diverticulum when occurring separately is in males, the combination takes place much more frequently in this group. Of the 162 cases reported, 80 per cent occurred in males.

The symptomatology, except in certain particulars, does not differ greatly from intussusception in general. These in the main are colicky pains, vomiting, meteorism, and melena. In general the type of intussusception which is caused by Meckel's diverticulum does not produce the last named symptoms as often as the ordinary variety, nor are the symptoms as acute. Tenderness, rigidity and abdominal tumor are the outstanding objective findings. In this type of intussusception it is difficult to palpate the invagination by rectum since this form rarely advances beyond the hepatic flexure.

Occasionally tumors of the diverticulum, in some cases due to the presence of accessory pancreatic tissue, result in intussusception. About 49 tumors of Meckel's diverticulum are on record, and over half of this number produced intussusception. Cases have been reported in which invagination of the diverticulum alone had occurred, and in one patient the diverticulum was not invaginated although it formed the apex of the intussusception. In such cases the diverticulum is always situated at the apex of the intussusception. The question as to whether the diverticulum invaginates primarily or secondarily, that is, at the apex or base, seems to be answered satisfactorily by the fact that, excepting one instance in which the diverticulum forming the apex of the intussusception was not inverted, the bulk of the evidence favors the view that the invagination of the diverticulum is primary.

The indications for operation and the operative procedure do not differ from those in intussusception in general. The best procedure is to excise the diverticulum, as was done in this case, to prevent recurrence. In

certain instances this will be obligatory by reason of the hemorrhagic congestion and devitalization of the diverticulum.

Intussusception due to Meckel's diverticulum must be differentiated from all varieties of acute abdominal emergencies. It has been most frequently confused with appendicitis, as in the case herein reported. Since the form of intussusception under discussion occurs in older individuals, the close resemblance of its clinical features to those of appendicitis is readily appreciated. The condition, however, has a much more chronic course than the ordinary infantile intussusception.

The fact that the patient was discharged from the hospital after his first admission as though spontaneously cured, only to be readmitted with a recrudescence of all symptoms, need not be considered as evidence that the intussusception reduced itself and recurred subsequently.

REFERENCES

(1) Aschner, P. W., and Karelitz, S.: Peptic Ulcer of Meckel's Diverticulum and Ileum. Ann. Surg., 91: 573, 1930.

(2) Hudson, H. W., Jr., and Koplik, L. H.: Meckel's Diverticulum in Children: a Clinical and Pathological Study. New England J. Med., 206: 827, 1932.

(3) Harkins, H.: Intussusception due to Invaginated Meckel's Diverticulum. Ann. Surg., 98: 1070, 1933.

(4) Hertzler, A. E., and Gibson, E. T.: Invagination of Meckel's Diverticulum Associated with Intussusception; Report of a Case with a Study of Recorded Cases. Am. J. M. Sc., 146: 364, 1913.

THE TRIANGULAR SHADOW AT THE BASE OF THE LUNG

Its Significance in Protracted Pulmonary Disease in Children

JEROME L. KOHN, M.D.

[*Pediatric Service of Dr. Bela Schick*]

A great deal of emphasis has been placed of late on the significance of a recurrent, dense, well defined, triangular shadow at the base of the lung in the region of the diaphragmatic vertebral angle. The apex of this triangle points toward the hilum. The hypotenuse extends from the hilum to a variable point on the diaphragm. The mesial border or altitude and the inferior border or base are indistinguishable from the shadow of the spine and the leaf of the diaphragm. This shadow has been regarded in most cases as representing pulmonary atelectasis in which under certain conditions bronchiectasis developed. A similar shadow, however, may also be produced by a mediastinal pleurisy and occasionally by localized fibrosis of the lung or an area of acute pneumonic consolidation. A comprehensive study of the significance of these triangular shadows has been made by Anspach (1), Findlay (2), Ellis (3), Warner and Graham (4), Richards (5) and others. The following two cases presented a triangular basal shadow, but the underlying pathological process was different in each case.

CASE REPORT

Case 1. This child had three admissions to the hospital with recurrent acute pulmonary manifestations. On each occasion there was found a triangular shadow at the base of the right lung; it appeared with each exacerbation of the pulmonary symptoms (Fig. 1). In the interim, the child was free of respiratory symptoms and both clinical and roentgen findings were negative. Iodized oil was injected into the bronchi to visualize the bronchial tree. It revealed a collapse of the right lower lobe and slight bronchial dilatation (Fig. 2).

History (H. N. 385383). A male child, aged $5\frac{1}{2}$ years, was admitted to the hospital on March 13, 1933 with a history of fever and cough of three days' duration. The child had pertussis when $4\frac{1}{2}$ months old. He also had some fever and cough three months before admission, which is said to have been diagnosed as pneumonia.

On admission, râles and bronchial breathing were heard at the right base posteriorly. He soon developed measles and was transferred to the Willard Parker Hospital. There bronchial breathing and fine râles were noted at the bases of both lungs. The course was mild, and the fever

lasted only two days. At the time of discharge from the Willard Parker Hospital, râles at both bases were still present. A chest roentgenogram showed a sharply defined dense homogeneous opacity at the right base obscuring the diaphragm and the cardiophrenic angle.

A year later he reentered The Mount Sinai Hospital with a history of cough, most marked in the morning, for the preceding two months, with an occasional rise of temperature to 101°F. Examination disclosed fine râles at the right base posteriorly with bronchial breathing at the left base. The roentgenograms showed an irregular shadow in the right

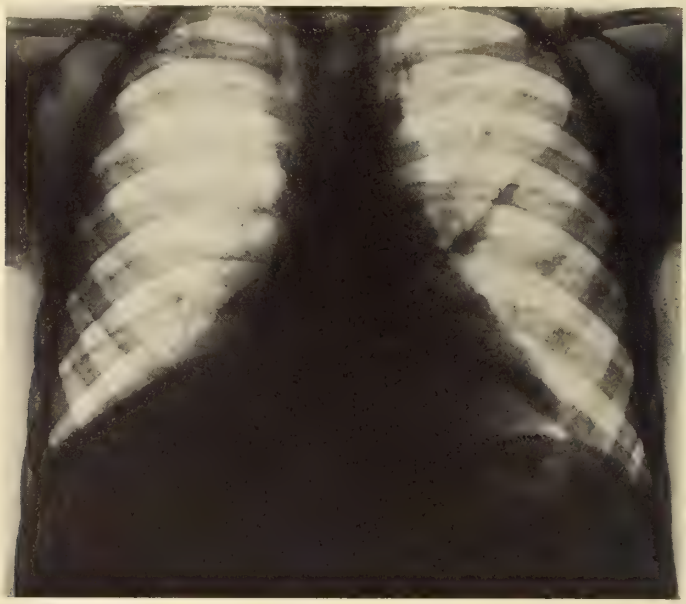


FIG. 1. Roentgenogram of the chest in case 1, taken on January 8, 1935. There is a small, dense, homogeneous triangular shadow near the spine partially obscuring the cardiac shadow. This triangular shadow reappeared with each exacerbation of the pulmonary symptoms.

cardiophrenic region. The temperature remained normal. The signs at the left base gradually cleared, but the râles at the right base persisted. There was only slight expectoration. The shadow in the right cardiophrenic angle was still present on the patient's discharge from the hospital (March 26, 1934). However, when seen on June 23, 1934, roentgenograms were negative, and there were no abnormal physical signs. Tuberculin tests were all negative.

On January 6, 1935 he was again admitted. At this time there was a history of cough and fever of three days' duration. There were dulness and diminished breathing with a few fine moist râles at the right base. The roentgenogram showed a rather dense triangular shadow at the right

cardiophrenic angle. His temperature was elevated to 102°F. for the first three days, after which it returned to normal. A bronchoscopy revealed no abnormality. A roentgenogram following iodized oil injection outlined all the bronchi of the right lower lobe except for the apical branch. The antero-lateral and postero-lateral branches of the right lower lobe bronchi showed some mild cylindrical dilatations. The right middle lobe bronchi appeared normal. The right lower lobe bronchi were closely approxi-



FIG. 2. Roentgenogram taken on the same day as that in Fig. 1, following the injection of iodized oil, shows the bronchi in the right lower lobe to be outlined except for the apical branch. The arrows point to the right lower lobe bronchi which were compressed. There was a compensatory emphysema of the right upper and middle lobes suggesting collapse of the right lower lobe.

mated, indicating collapse of the right lower lobe. There was a compensatory emphysema of the right middle and right upper lobes.

When seen six months later, the patient seemed to be in good health; there was no cough. On examination there was only a slight amount of dulness with diminished breathing and a few coarse râles at the right base.

COMMENT

While the bronchography demonstrated that the triangular shadow represented an atelectatic right lower lobe, there is some doubt as to the mechanism which caused the collapse of the lobe involved. Anspach

(1) believes that such recurrent collapse is caused by intermittent blocking of the bronchus presumably by mucoid exudate. In this case, however, examination after the injection of lipiodol showed the bronchus to be completely open, even at the time when the lobe was atelectatic. It is, therefore, evident that the collapse in this case was not secondary to a mucus block in the right lower lobe bronchus.

Only two possibilities present themselves: first, that the lobe remained collapsed, subsequent to the expectoration of the obstructing mucus, as

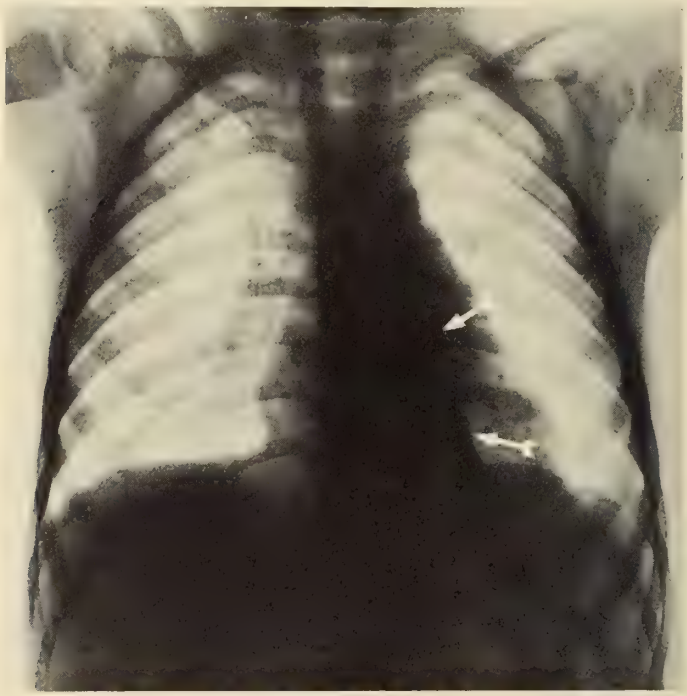


FIG. 3. Roentgenogram of the chest in case 2, taken on February 3, 1927. The arrows point to a dense, triangular, homogeneous shadow near the spine partially obscuring the cardiac shadow.

a result of fibrotic changes. The reexpansion of the lobe on one occasion negates this possibility. Second, that there was a closure of the smaller bronchi or bronchioles either by swelling of the mucous membrane or by exudate in the smaller bronchi and bronchioles. This latter change would clearly account for the recurrent transient atelectasis.

The downward rotation of the bronchi in the right lower lobe in cases such as this was pointed out by Richards (5). This is due to the fact that the lobe approaches the mediastinum as it collapses.

Case 2. This patient was observed over a period of almost ten years. During that time he had a constant cough, and examination of the lungs revealed abnormal findings clinically and roentgenologically. There were, however, no clubbing of the fingers or purulent expectoration. Since his first admission to the hospital, a dense homogeneous triangular shadow has been present at the left diaphragmatic vertebral angle, partially obscuring the cardiac shadow which is displaced to the left (Fig. 3). Iodized oil in-



FIG. 4. Roentgenogram of the same child as in Fig. 3, taken eight years later (November 19, 1934), following the injection of iodized oil. The roentgenogram shows displacement of the heart to the left. It also shows the left lower lobe to be shrunken while the left upper lobe fills up almost the entire left chest cavity. The terminal divisions of the bronchi enter a cavity (as indicated by arrows) measuring about 5 cm. in length and 2½ cm. in width.

jected into the bronchi outlined a large irregular cavity behind or in a shrunken left lower lobe at about the level of the tenth thoracic vertebra (Figs. 4 and 5).

History (H. N. 373591). A male child, aged 2 years, had cough and fever for one week before admission to the hospital. There was moderate dulness at both bases with bronchial breathing at the right base. A roentgenogram showed infiltration of the left lower lobe behind the heart shadow. The child was febrile for only two days and was not acutely

ill. Having been exposed to measles soon after admission, he was given convalescent serum. Mild measles developed. At the time of discharge from the hospital, he still had a few fine râles at the left base.

This boy has been seen repeatedly in the Follow-Up Clinic for the past ten years. He developed normally and remained in good physical condition except that he has continued to cough, especially in the morning.



Fig. 5. Lateral view of the chest taken at the same time as the roentgenogram in Fig. 4. The arrows point to the cavity above described which is situated close to the spine and gives the impression of being behind the shrunken left lower lobe. There is a probability that it is situated in the pleura.

Tuberculin tests have all been negative. The fine râles and dulness at the left base have persisted. Roentgenograms have shown displacement of the heart to the left and a dense triangular shadow posterior to the heart. On November 19, 1934 iodized oil was injected and the roentgenogram was interpreted as showing a shrinkage of the left lower lobe and emphysema of the left upper lobe. The terminal bronchi entered a

cavity with irregular outlines 5 cm. in length and $2\frac{1}{2}$ cm. in diameter near the spine at the level of the tenth thoracic vertebra. The cavity extended to the posterior chest wall and was thought to be situated in a shrunken left lower lobe, probably extending into the pleura.

On January 24, 1935, the child was again bronchoscoped and iodized oil was injected into the left lower lobe. A collection of iodized oil was noted in the left paramedial line overlying the ninth rib posteriorly. This corresponded to the collection previously noted which communicated with one of the paravertebral branches of the left lower lobe bronchi.

The child was again seen on September 19, 1935. He had been coughing very little during the preceding summer, and there have been no febrile periods. He has gained weight and engages in usual activities. Examination revealed very little alteration in resonance at both bases. There was a slight suppression of breath sounds at the left base, particularly in the paravertebral region, in which area fine moist râles were heard. On deep inspiration the breath sounds were markedly suppressed anteriorly in the left axilla. The cardiac apex was noted in the fourth interspace in the nipple line. The respiratory excursion of the right chest was greater than the left. Roentgenograms showed the same features as on previous examinations.

COMMENT

In this case the triangular basal shadow has remained constant and represents a permanently atelectatic lobe. This is complicated by the presence of an abscess cavity communicating with a bronchus.

It is extremely difficult at present to decide whether this is situated within the lung or in the pleura. Consequently there is no way of predicting how extensive an operation will be required to establish a complete cure. Since the cough is mild and there are no constitutional symptoms, it is felt that radical measures are not indicated now. The patient is still being observed with the reservation that should there be an activation of the lesion, surgical intervention will be attempted; the extent of the operative procedure will be dictated by the findings at that time.

REFERENCES

(1) Anspach, W. E.: Atelectasis and Bronchiectasis in Children. A Study of Fifty Cases Presenting a Triangular Shadow at the Base of the Lung. Am. J. Dis. Child., 47: 1011, 1934.

(2) Findlay, L.: Atelectasis or Compensatory Bronchiectasis. Arch. Dis. Child., 10: 61, 1935.

(3) Ellis, R. W. B.: Atelectatic Bronchiectasis in Childhood. Arch. Dis. Child., 8: 25, 1933.

(4) Warner, W. P., and Graham, D.: Lobar Atelectasis as a Cause of Triangular Shadow in Bronchiectasis. Arch. Int. Med., 52: 888, 1931.

(5) Richards, G. E.: The Interpretation of the Triangular Basal Shadows in the Roentgenograms of the Chest. Am. J. Roentgenol., 30: 289, 1933.

A NEW AND EFFECTIVE TREATMENT FOR TRICHOMONAS VAGINITIS

MAURICE E. MINTZ, M.D.

[*Gynecological Service of Dr. Robert T. Frank*]

In recent years the importance of non-gonococcal vaginal infection has been increasingly recognized, and the etiological significance of Trichomonas vaginitis has received particular attention.

Leucorrhea originates in the vagina itself in only a very small number of cases. In the great majority of instances it derives its origin from the cervical canal. Normally, the vaginal secretion is bluish-white and resembles ordinary skimmed milk both in color and consistency; it is slightly acid in reaction. The normal cervical secretion is absolutely colorless and only assumes a whitish hue in coming in contact with the acid vaginal secretion.

In Trichomonas vaginitis vaginalis, the vaginal discharge is usually thick, copious, yellow in color, offensive in odor, irritating and foamy. Under the microscope there are found a few epithelial cells, a large number of leucocytes, numerous bacteria, and actively motile trichomonads. The discharge is most marked at the end of the menstrual period, at which time the organism is found in large numbers.

Symptoms in Trichomonas Vaginitis. (1) Irritating vaginal discharge with rather offensive odor; (2) itching and burning around the vagina or rectum or both; (3) dyspareunia in about 50 per cent of the cases.

Vaginal examination. Usually shows an acute vulvitis and a thick foamy discharge from an inflamed vagina which bleeds very easily when wiped with a sponge. There usually is found an eroded cervix.

How to Examine for the Presence of Trichomonads. Take two drops of the vaginal discharge, which can usually be obtained from the withdrawn vaginal speculum, and add a few drops of warm normal saline solution and examine under high power, either on the flat slide or in hanging drops. The organism may readily be seen in large numbers and is extremely motile. The best time to examine the vaginal secretion is post-menstrual. The trichomonad is a parasitic protozoan which may be oval, round, pear-shaped, or quite irregular with amoeboid processes. It is slightly larger than a pus cell. It has an oval or spindle-shaped nucleus close to the anterior end, where four flagella arise. A fifth flagellum may occasionally be seen arising from the posterior end. The undulating mem-

brane is not always visible but arises from the anterior end and extends about half the length of the body. When not in motion, it is very difficult to distinguish the trichomonad from an ordinary pus cell, unless the spread is stained with carbol-fuchsin.

Treatment. (1) Give the patient seven vaginal suppositories of 1 per cent oxyquinoline sulphate, 1 per cent picric acid, $\frac{1}{4}$ per cent menthol, made up in cocoa-butter base. (2) Lactic acid solution, U.S.P.

Procedure. (1) The urine is examined for sugar to exclude diabetes. (2) Vaginal spreads are examined for gram-negative intracellular diplococci to exclude gonorrheal infection. (3) The cervix, if eroded, is treated before starting treatment. (4) All patients are instructed in personal hygiene after defecation (to wipe themselves away and not towards the vagina). (5) The patient is told to insert one suppository in the vagina every night before going to sleep and to keep the knees elevated for fifteen minutes, then to lie face down for fifteen minutes. The following morning the patient takes a douche with one teaspoonful of lactic acid to one quart of warm water. This procedure is followed for seven days. At the end of that time the patient continues to douche with the lactic acid for three more days. Then, for four days the patient stops all treatment and returns two weeks from the time of the beginning of the treatment for another vaginal spread. If still positive for trichomonads, the treatment is repeated for another two weeks; if found to be negative, the bladder is irrigated with potassium permanganate solution 1:5000, to prevent re-infection from the bladder. (6) The patient is instructed to take an enema with potassium permanganate solution 1:5000, to prevent re-infection from the rectum. (7) The patient is asked to return for three months after each menstural period for a final check-up.

Results. The above treatment was carried out at the Leucorrheal Clinic in The Mount Sinai Hospital on 100 cases of Trichomonas vaginitis. Seventy-five per cent of the cases were in married women, 11 per cent in single women, 8 per cent in separated women, and 6 per cent in widows. The ages varied between 18 and 60 years of age. The duration of the disease varied from one week to twelve years. Fifty-one per cent of the cases had had previous treatment. All of the patients were relieved of the itching and burning with the first set of suppositories and lactic acid douching, and there was a marked decrease in the vaginal discharge. In 70 per cent the vaginal spreads were found negative for trichomonads with one set of suppository treatment. Twenty-five per cent required a second set of suppositories and lactic acid douches before the spreads were negative for trichomonads. Five per cent, although relieved of practically all their symptoms, still had an occasional trichomonad present in the vaginal spread. This treatment may be used with safety in pregnant women suffering with Trichomonas vaginitis.

COMMENT

Heretofore, the treatment of this condition has not been satisfactory because the remedies available did not eradicate the causative factor. This new medicated suppository exerts a specific destructive action upon the trichomonad and by preventing re-infection from the bladder and rectum, the vaginitis is cured and remains cured. Even in long-standing cases the beneficial effect is exerted without local or systemic reactions. The treatment is easily carried out in the patient's home.

TREATMENT OF RHEUMATIC FEVER BY MULTIPLE CITRATE BLOOD TRANSFUSIONS*

HARRY WEISS, M.D.

[*Medical Service of Dr. B. S. Oppenheimer*]

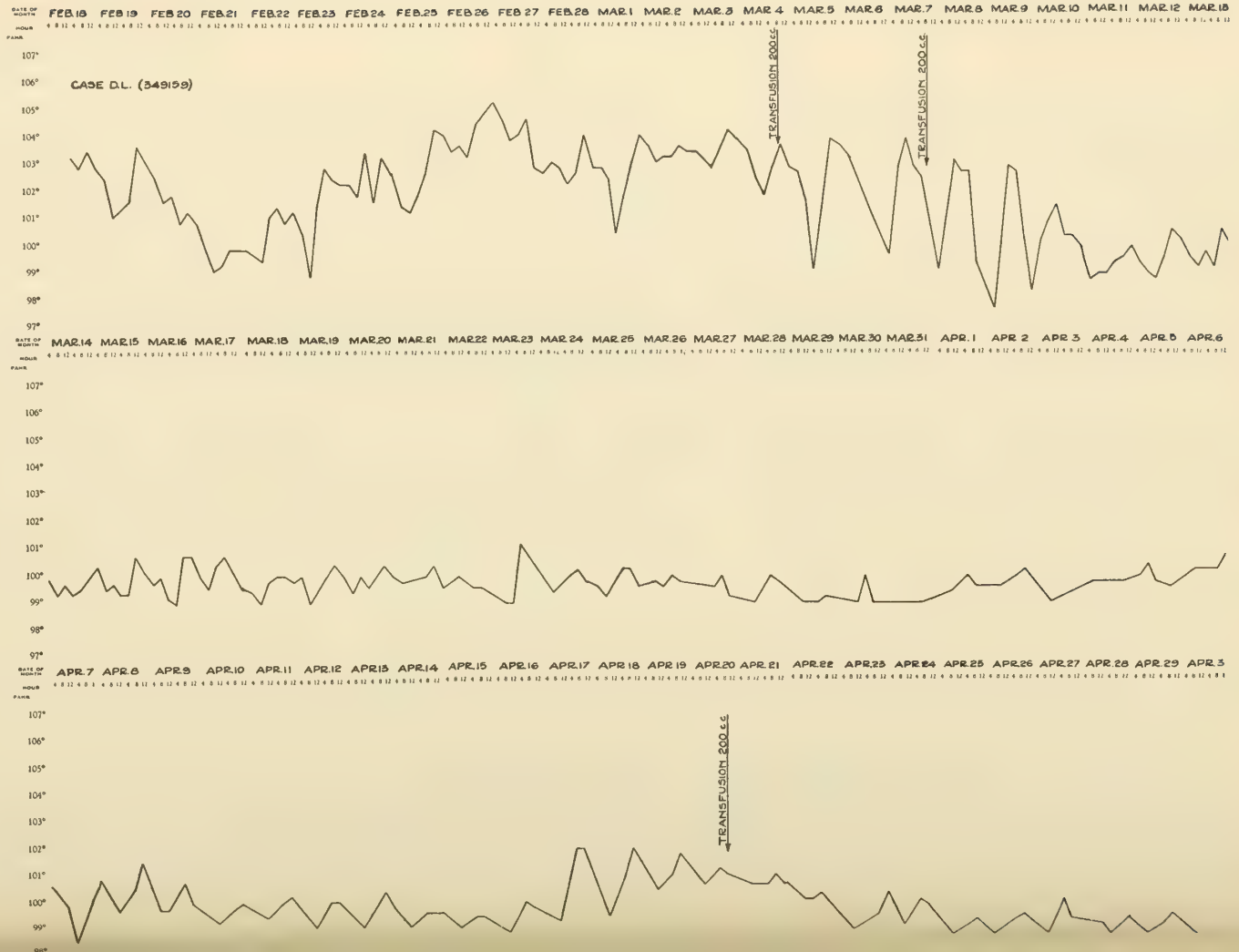
We have recently been treating cases of acute rheumatic fever by means of multiple citrate transfusions. Small quantities of blood are used, preferably between 150 and 250 cc. The blood is given by the intravenous drip method at the rate of thirty to forty drops per minute. A number of cases have been treated with satisfactory results. These will be reported in a subsequent communication. The following is a report of the first case so treated. During the course of treatment all medication was withdrawn, except codeine where it was indicated for the comfort of the patient.

CASE REPORT

History (D. L. 349159). The patient was a young man of 28 who was known to have had rheumatic fever with a migrating polyarthritis three years ago. This attack had lasted for four weeks. The past history was otherwise negative. Five weeks before his admission the patient developed an upper respiratory infection with fever and a non-productive cough. Soon after this he developed substernal discomfort accompanied by dyspnoea and mild orthopnoea. This disappeared but recurred again ten days before his admission, the dyspnoea now becoming very much more marked and the temperature more elevated. He had had a migrating polyarthritis during the course of his illness.

Physical Examination. On admission the patient was acutely ill, dyspnoeic and orthopnoeic. He showed a malar flush and labial cyanosis. The pharynx was congested. There were pulmonary signs present consisting of dulness merging into flatness, with absent fremitus, breath and voice sounds on the left side posteriorly, from the base up to the angle of the scapula. Above this level some scattered, fine, moist râles were present. At the right base posteriorly, there was dulness with loud bronchial breathing and some scattered fine râles. The heart was rapid; the rate was 136 per minute, and the rhythm was of the typical gallop type. The pulmonic sound was louder than the aortic. No definite murmurs were determinable at this time because of the tachycardia. No precordial friction rub was demonstrable. The cardiac dulness extended thirteen centimeters to the left of the midline and two centimeters to the right.

* Submitted for publication, July 29, 1935.


DATE OF MONTH
HOUR
FAHR.
FEB.18 FEB.19 FEB.20 FEB.21 FEB.22 FEB.23 FEB.24 FEB.25 FEB.26 FEB.27 FEB.28 MAR.1 MAR.2 MAR.3 MAR.4 MAR.5 MAR.6 MAR.7 MAR.8 MAR.9 MAR.10 MAR.11 MAR.12 MAR.13
107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
CASE D.L. (349159)
TRANSFUSION 200 c.c.
TRANSFUSION 200 c.c.
MAR.14 MAR.15 MAR.16 MAR.17 MAR.18 MAR.19 MAR.20 MAR.21 MAR.22 MAR.23 MAR.24 MAR.25 MAR.26 MAR.27 MAR.28 MAR.29 MAR.30 MAR.31 APR.1 APR.2 APR.3 APR.4 APR.5 APR.6
APR.7 APR.8 APR.9 APR.10 APR.11 APR.12 APR.13 APR.14 APR.15 APR.16 APR.17 APR.18 APR.19 APR.20 APR.21 APR.22 APR.23 APR.24 APR.25 APR.26 APR.27 APR.28 APR.29 APR.3
TRANSFUSION 200 c.c.

The blood pressure was 110 systolic and 60 diastolic. The liver was enlarged two fingers breadth below the costal margin. The spleen was not palpable. There was no ascites and no peripheral edema. The physical examination was otherwise negative.

Diagnosis. The clinical diagnosis was acute rheumatic fever with cardiac involvement and rheumatic pneumonitis (so-called "rheumatic pneumonia").

Laboratory Data. The admission blood count was 1,600 white blood cells with 80 per cent polymorphonuclear neutrophiles. The hemoglobin was 69 per cent. The sedimentation rate was 15 minutes. The icteric index was 13. The blood bilirubin was 0.3 mg. The Wassermann test was negative. The urine showed a one plus albumin; it contained bile and urobilin, and a few red blood cells and many granular and hyaline casts were present. The blood culture was negative. The electrocardiogram showed a prolongation of the P-R interval.

Course. Under observation a precordial friction rub developed and subsequently a pericardial effusion; the area of cardiac dulness apparently increased. The hemoglobin dropped to 54 per cent. Diagnostic aspiration of the chest failed to show the presence of any pleural effusion. During the first two weeks of his hospitalization the temperature rose to 104° and 105°F. and was sustained. His condition became progressively worse until it was considered almost hopeless. In spite of the fact that he was being kept continually under an oxygen tent, his respirations rose on occasion to forty and at one time to forty-four. The pulse rose to 140. A rapidly fatal issue was considered imminent.

In spite of the cardiac condition the patient was given a transfusion of 200 cc. of citrated blood by the drip method. Twenty-four hours later the temperature began to spike downward. (See accompanying chart.) Three days later a second transfusion was given, using the same quantity of blood and the same method. The fluctuations of the temperature continued for another forty-eight hours following which it began to range between 99° and 101°F. This low-grade, subfebrile course continued for six weeks without any sign of abatement. A third transfusion, similar to the first two, was then given. Following this the temperature gradually fell to normal. Coincident with the first drop in temperature the condition of the patient improved remarkably; the oxygen was discontinued, and the patient's recovery from this point on was progressive. At the time of his discharge (ten days after the third transfusion) his pulse rate was eighty per minute and his respirations twenty. With the slowing of the pulse the murmurs of a frank mitral stenosis and insufficiency and that of an aortic insufficiency became audible. The patient has been seen since his discharge; he has no complaints and presents no evidence of cardiac insufficiency.

PULSATING ANGIOBLASTIC SARCOMA

LEONARD JAMES DRUCKERMAN, M.D.

[*Service of Dr. Harold Neuhof*]

CASE REPORT

History (H. N. 380923). A married woman, 38 years old, noted a swelling on the ulnar aspect of the flexor surface of the right forearm. It had gradually increased in size in the course of the next four and a half months. Pressure over the tumor was noted by the patient to cause an appreciable diminution in the size of the swelling. It had been neither tender nor painful. Her past history was essentially negative except for vague joint pains, the nature of which had never been determined, and an appendectomy which had been performed in 1929. She entered the hospital on June 11, 1935 for surgical treatment.

Examination. There was a distinct and somewhat diffuse swelling on the flexor aspect of the right forearm, at about its middle, nearer to the ulnar than to the radial side. Though it was firm to palpation, it nevertheless felt as if deep fluctuation was present. There was a definite expansile pulsation discernible, the sides of the tumor moving in opposite directions with each heart beat. When one finger of each hand was placed firmly against the sides of the tumor, the pulsation could be recognized even more distinctly, as each finger was carried away about an eighth of an inch with each heart beat. Pressure over the tumor reduced its size somewhat and obliterated the pulsation of the ulnar artery at the wrist. A definite to and fro bruit, which was more marked during systole, was heard over the tumor; no thrill was palpable. The blood Wassermann test was negative.

Course. It was felt that the tumor was either an aneurysm of the ulnar artery or a very vascular sarcoma. The operating surgeon favored the latter against the opposing views.

On June 11, 1935 the patient was operated upon by Dr. Harold Neuhof. Avertin and gas-oxygen anesthesia was used. A six inch incision was made over the tumor, the deep fascia incised, and the muscles of the forearm overlying the tumor exposed. The flexor carpi ulnaris muscle was retracted laterally. The ulnar artery, vein and nerve were identified, found to have no connection with the tumor, and were also retracted laterally. The median nerve was identified and protected. The tumor was then exposed and found to arise from one of the bellies of the flexor sublimis digitorum muscle. Two clamps were placed across the muscle

well above the tumor, and the muscle cut across between these clamps. The tendon was cut in like fashion, and the muscle and the tumor were removed. The distal end of the tendon was sewn to an adjacent tendon of the flexor sublimis digitorum muscle. The fascia was sewn together with interrupted chronic sutures and the skin with dermo.

The postoperative course was uneventful; the wound healed by primary union. The patient was last seen on September 15, 1935, three months after the operation. Function at this time was good. There was no evidence of a recurrence. An X-ray of her chest was negative.

Nature of the Tumor. The surgical specimen was an elliptical mass

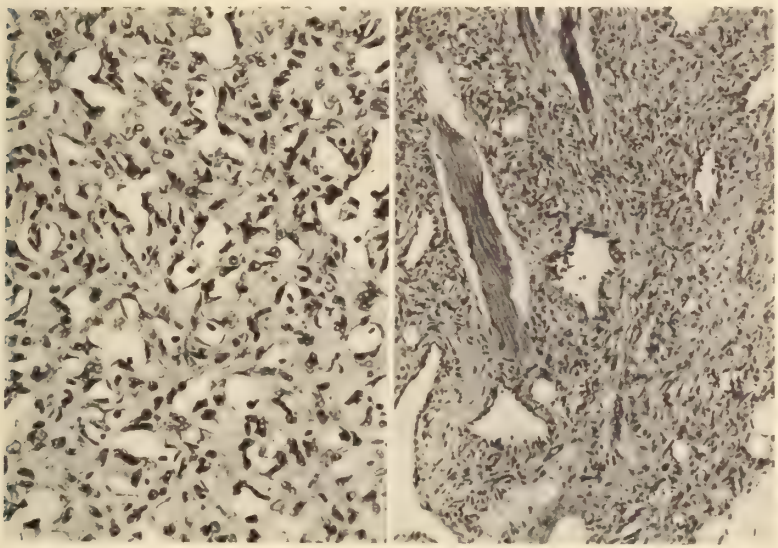


FIG. 1 FIG. 2

FIG. 1. Angiomatous structure of the tumor

FIG. 2. Tumor infiltrating muscle

measuring 5 by 3.5 by 2.5 cm., embedded in muscle tissue. The tumor was partially encapsulated by a thin glistening membrane which could not be stripped. It was fleshy in consistency, pink, compact, and presented on cut section numerous pin-point to pinhead sized spaces filled with blood. Microscopic examination showed the tumor to be very cellular and in places composed of edematous tissue, within which were many endothelial lined channels (Fig. 1) of various sizes, forming in some places cavernous channels. In some areas the cellular tissue produced knob-like extensions which bulged into the lumen of the cavernous channels. The cells lining these channels were similar to those forming the cellular tissue comprising the bulk of the tumor. Within this cellular

tissue there were pale, poorly stained, single and grouped voluntary muscle fibres which had lost their striations and were shrunken. The cytoplasm of individual cells could not be delineated. The nuclei were elliptical and elongated and had a fine granular or thread-like chromatin. Some of the nuclei were vesicular and contained a single eccentrically placed darker staining nucleolus. There was an occasional mitotic figure. Between cells there was a loose eosinophilic tissue which in Van Gieson's stain appeared as fine red fibrils in a yellow cytoplasmic background. There were also some medium sized arteries with thick muscular coats which contrasted strikingly with the newly formed channels without muscular coats described above. In places the tumor was surrounded by loose areolar tissue, and in still other places the areolar tissue capsule was absent altogether and the tumor tissue merged with the muscle (Fig. 2).

The report of the pathologist was "fibro-angioblastic sarcoma, the histological structure resembling that of metastasizing hemangioma" (3, 4).

COMMENT

This case is reported because of the relative infrequency of this type of tumor, particularly in view of the misleading signs of expansile pulsation, bruit, and partial reducibility. The most recent review of cases of this type is that of Jenkins and Delaney (2), who collected 256 cases. Most of these were already noted in a previous publication by Davis and Kitlowski (1). Jenkins and Delaney pointed out that "On palpation, the tumor was described as tender in 72 cases, compressible in 23, reducible in 21, pulsating in 5, expansile in 1. There was no palpable thrill mentioned in any case report. On auscultation, only one was found to have a bruit or souffle". There were, then, only 5 cases which definitely pulsated (Davis and Kitlowski, cases 103, 130, 167; Jenkins and Delaney, cases 46 and 54). Only one of these had a bruit (Jenkins and Delaney, case 46). It exhibited pulsation also and was thought to be an aneurysm of the temporal artery. A tumor in this group, described as "expansile", was also one in which pulsation was found.

In our case there was a definite diminution in size of the tumor on applying pressure. On releasing the pressure, the tumor gradually returned to its usual size. There was also a definite expansile pulsation and a bruit, signs which were found because they were looked for. It is quite probable that these signs would have been found in a larger proportion of the reported cases, had they been looked for.

The clinical features of this type of tumor are well described in the two articles cited above (1, 2), and may be summed up as follows:

Angiomata are most common in childhood and in early adult life, 79 per cent appearing in the first twenty years of life and 94 per cent within the first thirty years of life. These percentages are based on the time of

appearance of signs or symptoms of the tumors, not on the ages at which the patients came to operation. In 204 cases and in the one just reported, there were 97 males and 108 females. The tumors, though found in any of the muscular regions of the body, were nevertheless most frequent in the thigh, leg, chest, forearm, upper arm, and head, in the order given. In most instances there was a definite tumor, although in some cases in which the lesion was deeply situated, they were found only on exploration, undertaken because of pain. The size varied from that of a bean to that of a child's head. In a few cases the overlying skin was bluish and the veins were distended. The tumors varied in consistency; they were either soft or hard and occasionally were fluctuant. The other palpatory findings were already referred to above, such as compressibility, reducibility, pulsation and expansibility. Elevation of the part produced a diminution in size in 12 cases and disappearance in 4 cases. Lowering of the part caused an increase in size in 16 patients and increased firmness in 3. Pain was present in 144 cases and absent in 30. It was absent in the case herein reported. The inclusion of nerves in the tumor was probably the cause of the pain in some instances. Impairment of muscular function and deformity were not infrequently caused by the size or location of the tumor.

Two diagnostic tests not employed in our case are of unquestionable value. They are the obtainment of blood on aspiration of the tumor and X-ray examination of the involved part, which may reveal phleboliths as found in 14 out of 24 reported cases so examined (1, 2).

REFERENCES

(1) Davis, J. S., and Kitlowski, E. A.: Primary Intramuscular Hemangioma of Skeletal Muscle. Arch. Surg., 20: 39, 1930.

(2) Jenkins, H. P., and Delaney, P. A.: Benign Angiomatous Tumors of Skeletal Muscles. Surg. Gynec. & Obst., 55: 464, 1932.

(3) Livingston, S. F., and Klemperer, P.: Malignant Angiomas. Arch. Path., 1: 899, 1926.

(4) Ewing, J.: Neoplastic Diseases. 3rd Ed. New York, W. B. Saunders & Co., 1934, p. 245.

LYMPHOGRANULOMA VENEREUM

Report of a Case with Glandular Enlargement and Hepatosplenomegaly

BORRIS A. KORNBLITH, M.D.

[*Medical Service of Dr. B. S. Oppenheimer*]

The specificity of the Frei test has been very helpful in clarifying a number of cases of lymphogranuloma venereum which would otherwise have remained obscure and probably undiagnosed. The following case was thus identified in spite of its unusual symptomatology and clinical course.

CASE REPORT

History (H. N. 384843). A twenty-eight year old, married, Italian taxi-cab driver was admitted to the hospital on August 24, 1935. Nine days before his admission he suddenly became ill with headache and shaking chills; his temperature rose to 103°F.; pain developed in the left groin, and a small tender mass appeared in that region. He had four chills in all. He began to lose weight and found it difficult to walk. His past history revealed no significant data.

Examination. The patient was a well nourished white male. The skin was pale. In the left inguinal region there was an obvious, markedly tender, walnut-sized swelling which felt like an agglomeration of lymph nodes. The structures surrounding the vas deferens as they entered the external inguinal ring were markedly tender, while those on the opposite side showed no abnormality. An indefinite mass was felt in the left lower quadrant of the abdomen, corresponding in location to the iliac nodes. The liver was enlarged to the umbilicus; its edge was soft. The spleen likewise was enlarged and was felt three fingers-breadth below the costal margin; its edges were soft and smooth. On rectal examination a number of nodes were palpated on the affected side, i.e., the left side. These extended behind the pubis as far as the index finger could reach. Fundus examination revealed a small flame-shaped hemorrhage superficially in the retina immediately in the periphery of the optic nerve.

Laboratory Findings. The blood Wassermann test was negative. Hemoglobin was 82 per cent. The red blood count was 5,500,000. The white blood count was 14,400 with 70 per cent polymorphonuclear leucocytes, 3 per cent non-segmented polymorphonuclear leucocytes, 4 per cent eosinophiles, 18 per cent lymphocytes, and 5 per cent monocytes.

Bleeding time was 1 minute, coagulation time 3 minutes. Tourniquet test was negative. Urine was negative. Blood cholesterol was 300 mg. per cc., ester 100 mg. per 100 cc.

Diagnosis. On admission the diagnosis of aleukemic leukemia was entertained. This, however, was ruled out by the blood count. The blood picture was suggestive of infectious mononucleosis. The heterophile reaction, however, was negative, nor did subsequent blood counts tend to confirm the diagnosis of infectious mononucleosis. The diagnosis of lymphogranuloma venereum was suggested and confirmed on two occasions by the Frei test.

The patient remained in the hospital for twelve days. During that time his fever ranged between 99° and 101°F. His liver and spleen diminished in size. His general condition improved, and he was discharged to the Out-Patient Department.

DISCUSSION

A review of the clinical manifestations of the cases seen in this hospital will serve to bring out the unusual features of this case report. There were twenty-nine men and one woman. Among these were nineteen white men, six Porto Ricans, four negroes, and one negress. The average age was twenty-nine, the youngest being sixteen years, the oldest forty-three years.

The Initial Lesion. A history of an initial lesion was obtained in only twelve of this group. The nature of the lesion was described as a papule, vesicle, small ulceration about the corona, or herpetiform lesion on the shaft of the penis. Four patients gave a history of urethritis. This is interesting because it is confused with gonorrheal infection. This urethritis, which is very likely specific, differs from gonorrhea in that the discharge is loose, shows only leucocytes but no organisms, and disappears spontaneously within three or four days without treatment.

Contact. Without exception, all of the white men gave a history of contact with a negress, and a good number of them could definitely refer the onset of their disease to such contact. This was likewise true in the case reported. The patient stated that he had had sexual intercourse with a negress and that he had not been well since then.

The Incubation Period. This can not be determined accurately. A probable time interval of between two and five days may be considered as likely. In most of the cases the primary lesion healed spontaneously within two weeks after its appearance. The glandular enlargement occurred within four days to three weeks after the appearance of the initial lesion. The enlargement was unilateral in nineteen cases, bilateral in eleven cases. The four cases which presented the urethritis as their initial lesion had bilateral inguinal glandular enlargement. The glands broke down and formed pus in twenty of the thirty cases (66 per cent)

within three weeks after the enlargement was noted. In other words, it takes about six weeks from the onset for the inguinal glands to reach their maximum reaction. By that time, they have either broken down or begun to recede. The enlargement of the iliac glands in the cases seen could be felt in the lower quadrant of the abdomen. Enlarged perirectal glands were likewise felt on the affected side.

Signs and Symptoms.[1] The structures surrounding the spermatic cord as it enters the inguinal ring on the affected side are tender to the palpating finger. The cord in the scrotum is not tender, but the inguinal ring is definitely tender to touch. The opposite side is entirely unaffected. The reason for this clinical sign can be found in the nature of the anatomic involvement. The lymphatics course through the inguinal canal and thus make a direct line of communication between the inguinal glands, which are subcutaneous, and the lymph nodes in the retroperitoneal space in the iliac region. Whenever the inguinal nodes are involved, the retroperitoneal nodes are likewise affected to a greater or lesser extent. This has been demonstrated in the operating room when an attempt was made to do a block excision of the affected glands. Relatively thick lymphatic strands could be traced through the external inguinal ring and also through the fossa ovale in the femoral triangle, going through the inguinal canal. Generalized adenopathy with abscess formation in the submental region occurred in one case. This was unusual. The glandular enlargement in all other cases was limited to the inguinal and iliac glands.

Hepatosplenomegaly. Enlargement of liver and spleen in lymphogranuloma venereum is a very unusual feature. Actual disease of the liver and lungs was demonstrated experimentally. The histologic lesions, however, are non-specific. The enlargement of the liver and spleen, therefore, is likely a toxic manifestation in the acute stages of the disease. This was confirmed clinically by the fact that with the subsidence of the clinical symptoms, such as fever and malaise, the liver and spleen diminished to their normal size.

Fundi Oculi. A flame-shaped hemorrhage in the fundus has never been described before. This may likewise be explained on a toxic basis as a complication of the specific disease, lymphogranuloma venereum. A Japanese observer (1) reported twenty-one cases showing papilledema. He looked for this sign in the belief that, since the disease in question is caused by a filterable virus, it is likely to infect the central nervous system. Though it is possible to infect experimental animals by intracerebral injections, no specific retinal changes have ever been described before this.

Laboratory Findings. The *Wassermann* reaction was negative in all

[1] Another group of cases of lymphogranuloma venereum with rectal and genital lesions was reported by Goldberger and Auslander (2) and Bernstein (3) in previous communications. This report concerns itself only with a case showing glandular enlargement.

but two cases. One case with a two plus Kahn reaction at onset became negative three months later without any antiluetic treatment. The other case was a known luetic. Similar cases have been reported in the literature, i.e., cases in their acute stages which show positive Wassermann reactions though they are not due to syphilis.

Bacteriologic culture of pus, in all of the cases where it had not broken through the skin spontaneously, was sterile. Ziehl-Neelsen stain for tubercle bacilli was also negative.

A *biopsy* of an inguinal gland was sufficient for diagnosis, showing a characteristic lesion in eleven out of thirteen cases examined. The two cases that presented a picture different from the usual one were of at least three months' duration and were both complicated by chronic persistent sinuses and secondary infection with staphylococcus aureus. These were the only two cases in this group in which a culture from the glands or pus removed was not sterile. This alone may be sufficient to change the pathological picture to one of chronic adenitis. It is, therefore, justifiable to say that biopsy of the lymph nodes is quite reliable in making a diagnosis.

Treatment. The problem of treatment of the glandular cases up to the present has been essentially a surgical one. Incision and drainage proved necessary and sufficient in most cases. A more radical procedure such as complete excision of the inguinal glands became an optional one in the majority of the cases. In three cases the inguinal glands were excised bilaterally, and in still another case extensive suppuration with spontaneous healing occurred. The penile lesion in these four cases healed completely and there was no history of reinfection, even as long as twelve years later. None of these four cases developed pudendal lymphedema. In one other case the patient developed tremendous lymphedema within six weeks after excision of the inguinal glands. The lymphedema, however, was preceded by groups of vesiculopapular penile lesions, which persisted for a number of months. After excision of the inguinal glands or their destruction by the disease, the new course of the lymph is through the scrotum, through the central point of the perineum, and into the endopelvic glands. This new course seems to form an adequate collateral circulation when no further infection is present in the external genitalia. With a persistent focus of infection the local disease spreads to the anastomotic lymphatics and elephantiasis of the penis and scrotum follows. Similarly, in the female a persistent focus on the external genitalia is likely to produce vulval elephantiasis.

With the realization of a later sequel such as stricture of the rectum and possible elephantiasis of the genitalia, it is advisable to resort to more conservative measures. In two cases large fluctuant abscesses formed in the groin. These were treated by aspiration and repeated injection of 0.1 cubic centimeters of Frei material for twelve injections. Although

small sinuses formed at the site of puncture, both of these cases subsided without any further therapy. Nine cases in all received Frei antigen in increasing doses, the highest solution being 1 to 400. In five cases no breaking-down occurred, while in two cases where sinuses had formed before treatment was begun, these closed promptly. These nine cases suggested the possible therapeutic effect of attempt at desensitization. It is particularly noteworthy that the pain and tenderness of the involved glands disappeared very promptly, as early as after the second injection. It is also noteworthy that the last injection was followed by a positive reaction. Thus the Frei test has remained positive after as many as sixty injections over a period of two years.

Other forms of treatment in our cases consisted of X-ray therapy, ultra-violet ray therapy, foreign protein therapy (typhoid vaccine), and arsphenamine, all without any evidence of success. It seems advisable, therefore, to treat these patients more conservatively, to attempt aspiration where it is indicated, in addition to desensitization. If these methods should fail, surgical incision and excision are indicated.

The average period of disability in this series of cases was two weeks in the hospital and from two to seven months in the clinic for dressings. All cases in this group were reported healed by the end of seven months.

REFERENCES

(1) Kitagawa, K.: Lymphogranuloma Inguinale; a Report of 37 Cases, especially Findings in the Cerebrospinal Fluid and Eye Grounds. J. Oriental Med., 20: 48, 1934.

(2) Goldberger, M. A., and Auslander, J.: Lymphogranuloma Venereum; with a Report on Two Cases. J. Mt. Sinai Hosp., 2: 209, 1936.

(3) Bernstein, P.: Lymphogranuloma Inguinale, Carcinoma and Syphilis: Triad of Diseases Occurring in One Patient. Am. J. Obst. & Gynec., 29: 718, 1935.

SPONTANEOUS HEPATICODUODENOSTOMY[1]

HENRY HORN, M.D.[2]

[*From the Division of Laboratories*]

Spontaneous internal biliary fistulae are not uncommon observations. Nevertheless, their occurrence when compared with the incidence of biliary tract disease is remarkably infrequent. The following case is unusual in so far as it is the fifth recorded instance in which the hepatic duct has been involved in a spontaneous hepaticoduodenal fistula. It is of further interest because of the patient's long survival in the presence of a complete obstruction of the common bile duct.

CASE REPORT

History (H. N. 377552). In June 1929 the patient entered another hospital because of recurrent pain in the right upper quadrant for the preceding nine years. This pain was sharp and radiated occasionally to the back and to the right lower quadrant of the abdomen. There were no associated jaundice, vomiting or clay-colored stool. Findings at that time were negative except for moderate tenderness in the right upper and slight tenderness in the right lower quadrant. A cholecystectomy and appendectomy performed on June 12, 1929 revealed chronic cholecystitis, cholelithiasis, and chronic appendicitis.

Almost immediately following this operation, the patient became jaundiced, and her stools became clay-colored. She began to complain of abdominal discomfort and of more frequent right upper quadrant pain. The operative wound drained bile for five weeks and then closed spontaneously.

The patient's symptoms persisted, however, and she returned to the same hospital July 29, 1930 for further observation. Since she did not respond to medical management, she was reexplored. The findings were recorded as follows: "The stomach and duodenum were found densely adherent to the lower surface of the liver and were separated only with difficulty down to the cystic stump. Beyond this point the adhesions were so dense that separation was deemed inadvisable for fear of injuring the duodenum. The common duct could not be found. The abdomen was closed without drainage."

Jaundice and pruritus continued until her admission to The Mount

[1] Presented before the Clinical Pathological Conference of The Mount Sinai Hospital, March 20, 1935.

[2] Eugene Meyer Fellow in Pathology.

Sinai Hospital. Her stools remained light but definitely not clay-colored. She had been performing duodenal drainage upon herself, obtaining bile and in this way gaining relief of symptoms.

First Admission to The Mount Sinai Hospital. The patient (H. N. 377552), a 53 year old white female, was first admitted to the hospital on April 14, 1934 (Service of Dr. B. S. Oppenheimer). Examination at this time revealed a deeply icteric woman. The liver edge was irregular and extended to a point 5 cm. below the right costal margin. The spleen was palpable at a point 2 cm. below the left costal margin.

Clinical Data. Duodenal drainage yielded a grass-green fluid which contained a few white cells.

Stool. Positive for urobilin, negative for blood.

Urine. Positive for urobilin and bile. Twenty-four hour specimen negative for tyrosine.

Blood. Total cholesterol, 560 mg. per 100 c.c.; cholesterol ester, 290 mg. per 100 c.c. Icteric index, 45. Van den Bergh, direct, prompt positive; indirect, 1:40,000, 2.5 mg. Hemoglobin, 86 per cent; white blood cells, 7,900; polymorphonuclear leucocytes, 74 per cent; lymphocytes, 26 per cent.

The blood pressure was 140 systolic and 78 diastolic. The temperature was normal except for two rises to 100°F.

Diagnosis. It was felt the patient had an incomplete common duct obstruction probably due to stricture associated with obstructive biliary cirrhosis. Operation was refused and the patient was, therefore, discharged on May 31, 1934 to be observed in the Out-Patient Department.

Second Admission. She returned to the hospital March 11, 1935. Jaundice had persisted, and the pruritus had become distressing. Her fairly satisfactory general condition had now begun to decline. Since the early part of February 1935, anorexia, loss of weight and increasing weakness appeared. For the two weeks preceding her present admission there was a slight elevation of temperature accompanied by an occasional chill. Ecchymoses appeared in the skin over the abdomen and lower extremities. On the day prior to her admission she vomited bloody fluid, and she noted blood in her stool.

Examination. The patient was emaciated and deeply jaundiced. There were xanthelasma over both upper and lower lids and marked scleral icterus. The irregular and hard liver edge was palpable three fingers breadth below the costal margin. The skin of the abdomen, forearm and thighs was the site of scattered ecchymotic areas.

Clinical Data. Stool: guaiac test positive. Urine: negative for tyrosine; positive for bile and urobilin.

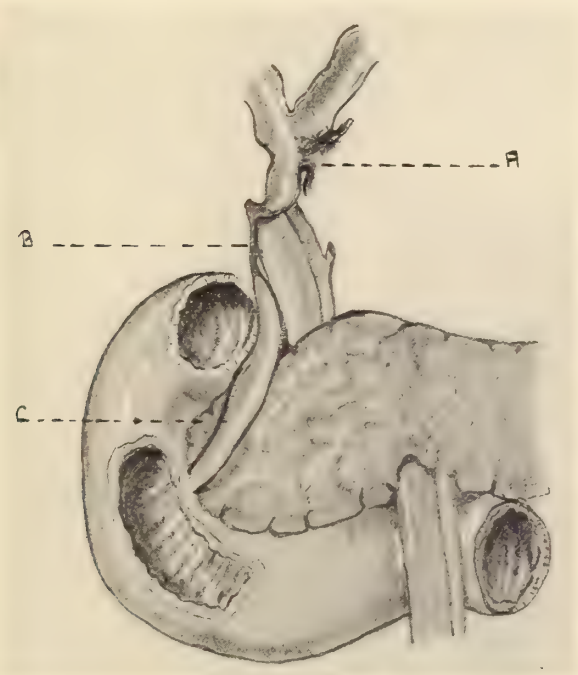
Blood: Total cholesterol, 200 mg. Cholesterol ester, 43 mg. Icteric index, 40. Van den Bergh, direct, prompt positive; indirect, 1:40,000, 2.5 mg. Red blood cells, 1,540,000. There were pronounced qualitative

changes in the red cells, consisting of macrocytosis, poikilocytosis, anisocytosis, and marked achromia. White blood cells, 21,900; polymorphonuclear leucocytes, 90 per cent; lymphocytes, 8 per cent; monocytes, 2 per cent.

Urea, 42 mg. per 100 c.c.; sugar 165 mg. per 100 c.c.; calcium, 8.7 mg. per 100 c.c.; chlorides, 630 mg. per 100 c.c.

A blood culture was negative.

The blood pressure was 88 systolic and 40 diastolic. On admission the



Drawing to show stenosis of common bile duct (portion of duodenum removed). a. Site of hepaticoduodenal fistula. b. Stenotic portion of the duct. c. Common bile duct.

temperature was 101°F. It fluctuated irregularly between 100.6° and 104.2°F.

Course. The patient declined steadily and progressively, vomited bloody fluid, and lapsed into coma three days following admission. She died on March 14, 1935.

Necropsy Findings. Liver. The organ was moderately enlarged, firm, and its surface finely wrinkled and deep green. On section the portal areas were prominent and appeared as dull, pin-head sized, green-yellow, poorly circumscribed areas, and about these the liver parenchyma was deep green. The intrahepatic biliary passages throughout the cut surface

were dilated, particularly in the left lobe. The walls of the duct were moderately thickened. One duct toward the upper lateral portion of the right lobe of the liver was markedly distended with thick purulent fluid. This duct led directly to an abscess cavity in the right latero-superior portion of the right lobe. The cavity was 3 cm. in diameter and contained thick, yellow fluid. The wall of the cavity was thin but distinct, its inner surface roughened and hemorrhagically discolored. The right and left main hepatic ducts were also dilated, their walls distinctly thickened, and their lumina filled with thick purulent fluid.

A fistulous tract arising from the left main hepatic duct led directly to the upper convexity of the second part of the duodenum. The mouth of the tract was 4 mm. in diameter; its edges were rounded. The fistulous tract, although arising just above the junction of the right and left hepatic ducts, seemed to be in more direct communication with the right branch (see drawing). The duodenal mucosa was pale and finely granular. The gall-bladder was absent. The ductus choledochus, for a distance of 2 cm. distal to its cystic end, was cord-like and its lumen completely obliterated. Distal to the stenotic portion the lumen of the duct was moderately dilated and contained turbid yellow fluid. The papilla of Vater, except for slight widening, presented no changes.

Spleen. The cut surface of the spleen was fleshy and showed prominent trabeculae. The splenic vessels displayed no gross alterations.

Bacteriology. Culture of the fluid in the fistulous tract revealed the presence of Streptococcus hemolyticus (beta), Streptococcus viridans (alpha), and B. Coli.

Microscopic Findings. Liver. The liver cells showed a finely granular, slightly foamy cytoplasm. Their nuclei were pale. There were diffuse and frequent cellular depositions of bile pigment and bile thrombi both within the sinusoids and the interlobular bile ducts. In scattered areas the hepatic cells were separated and showed moderate autolysis and nuclear pyknosis. There was separation of the sinus reticulum from the cell cords. All these changes were more pronounced at the periphery of the liver lobules and in the areas adjacent to the central venules. The sinusoids bordering upon the central venules were frequently distended with erythrocytes. Here as well as in the periportal zones there was cellular necrosis.

The portal fields contained marked cellular infiltrations consisting of polymorphonuclear leucocytes, small lymphocytes and plasma cells. The periportal connective tissue was moderately increased and radiated to adjacent parts of the liver lobule. In a few areas these fibers enmeshed some degenerated liver cells containing much bile pigment. With silver stains it was possible to demonstrate that in the vicinity of the periportal fields the reticular fibers were distorted, often disrupted and not infrequently closely approximated.

The larger intrahepatic bile ducts were diffusely infiltrated by many plasma cells, small round cells and polymorphonuclear leucocytes. The hepatic vessels presented no remarkable histopathological changes except for the perivascular infiltrations of the type seen about the ducts.

Common Bile Duct. The completely obliterated portion of the duct revealed sections of hypertrophied nerve bundles surrounded by dense cellular connective tissue. In the periphery of the section there were scattered multinucleated giant cells (foreign body type), histiocytes, a few round cells and fibroblasts. A section through the common bile duct, distal to the site of the obstruction, presented the following: the epithelial layer was barely recognizable; there was seen only a flattened layer of smudgy cells, only rarely retaining the normal cuboidal contour. The subepithelial tissue contained a small number of lymphocytes, plasma cells, and the usual few scattered nests of alveolar structures. Their lumen contained many desquamated epithelial cells and a few polymorphonuclear leucocytes. The elastic fibers of the subepithelial layer were reduplicated, often fragmented, but the connective tissue was only slightly increased. There was noted, too, in this section a hypertrophy of nerve bundles.

Spleen. Sections of the spleen presented reticulum cell hyperplasia, sinus hyperplasia, slight fibrosis and erythrophagocytosis.

COMMENT

To explain the development of the spontaneous hepaticoduodenostomy in the case reported here, it is necessary to consider the following possibilities:

1. A biliary calculus lodged within the main hepatic duct possibly produced a decubitus ulcer at the site of lodgement. The latter with the associated reactive cholangitis stimulated the formation of choledochoduodenal adhesions. Subsequent perforation of the hepatic duct wall into the adjacent duodenum occurred with the establishment of the fistulous tract.

2. Accidental incision or ligature of the common bile duct, followed by stricture, ascending cholangitis, and then by the train of events described above.

3. Pressure by gauze drains with ulceration of the hepatic duct, pericholedochal abscess formation followed by duodenal involvement and formation of the hepaticoduodenal fistula.

The patient's immediate postoperative course speaks for the combination of accidental injury to the common bile duct with perhaps a retained calculus in the hepatic duct as the etiological factors. The operative finding of cholelithiasis, the rapid onset of jaundice, the right upper quadrant pain and the presence of an external biliary fistula are all in favor of such an explanation. The spontaneous hepaticoduodenostomy,

although apparently helpful in delaying a fatal issue, was certainly inadequate, and this deficiency associated with low-grade cholangitis may account for the clinical manifestations of incomplete obstructive jaundice.

There are many instances of internal biliary fistulae reported in the literature. Courvoisier and Naunyn (Colp) collected a series of 384 cases of biliary fistulae, of which 200 were internal. (External fistulae are not discussed here). The collected statistics of Roth, Schrader and Schloth (Kellogg) include 43 instances of biliary fistulae in a series of 10,866 autopsies. In a group of 153 cases reported by Judd and Burden in which operation had been performed, there were 148 cases with fistulous tracts between gall-bladder and duodenum, one between common duct and duodenum and four between the cystic duct and duodenum.

There are several varieties of internal biliary fistulae. The literature records instances of fistulous tract formation between the biliary tract and any of the structures in its vicinity. Thus fistulae between the gall-bladder and the duodenum are probably the most common variety. Fistulous communications between the gall-bladder and the transverse colon are relatively frequent; between the cystic duct or common duct and duodenum, or gall-bladder and stomach they are infrequent. Only four instances of spontaneous fistulous communication between hepatic duct and duodenum have been previously reported (Lahey).

Biliary genito-urinary fistulae have also been noted. Moynihan quotes von Bergmann's case of a woman of 63 who complained of pain and swelling in the right hypochondriac region for a period of 18 years. This swelling was opened finally, and biliary calculi were removed from a dilated urachus. There are also reports on bronchobiliary and biliary-pericardial fistulae. Rare instances of biliary-portal vein fistulae have also been observed.

Spontaneous biliary fistulae are further classified into direct and indirect types, a designation depending upon the presence of intervening tissue between the tract openings. The direct biliary fistula is the more common type. The most usual abnormality associated with biliary fistulae is the presence of calculi; less often there is a neoplastic growth; rarely trauma by penetrating wound or abdominal contusion bears an etiological relationship.

The formation of a spontaneous internal biliary fistula may occasionally offer relief to the patient. Frequently enough, however, such a development is attended not only by an aggravation of, but also additions to, the patient's original complaints. Instances of intestinal obstruction following the formation of a biliary-duodenal fistula caused by lodgement of the passed biliary calculus in the jejunum or the ileocecal valve are familiar catastrophies. Erosion of a blood vessel during the formation of the fistula has given rise to serious and even fatal hemorrhage. Finally an exacerbation of a cholangitis might occur with its attendant train of symptoms.

SUMMARY

A case is presented of a 53 year old, white woman who developed jaundice and had clay-colored stools almost immediately after a cholecystectomy and appendectomy in 1929 for chronic cholecystitis, cholelithiasis and chronic appendicitis. Following her operation she also developed an external biliary fistula which drained for five weeks. Jaundice persisted steadily and her stools remained light but definitely not clay-colored. Study of her case at The Mount Sinai Hospital four years after her first operation presented evidence of an incomplete common duct obstruction. Operation was refused. One month before death the patient began to lose weight and strength and toward the end manifested fever, chills, and preterminally, hematemesis, bloody stools, and ecchymoses. Death occurred five and one-half years after the onset of jaundice. The significant necropsy findings were complete stenosis of the upper portion of the common bile duct, chronic ascending cholangitis, and pericholangitis, spontaneous hepaticoduodenostomy (internal biliary between the left main hepatic duct and duodenum), and splenomegaly.

REFERENCES

Colp, R.: External Duodenal Fistulae. Ann. Surg., 78: 725, 1923.

Judd, E. S., and Burden, V. G.: Internal Biliary Fistulae. Ann. Surg., 81: 305, 1925.

Kellogg, E. L.: The Duodenum. Hoeber's Surgical Monographs. New York, 1933.

Lahey, F.: External and Internal Biliary Fistulae following Cholecystectomy. Ann. Surg., 92: 649, 1930.

Mayo-Robson, A. W.: Fistula between the Stomach and Bile Passages. Brit. Med. J., 1: 1050, 1909.

Moynihan, B. G. A.: Gall Stones and their Surgical Treatment. New York and Philadelphia, W. B. Saunders & Co., 1905.

CLINICAL CONFERENCE OF THE THORACIC GROUP

Monday, March 2, 1936

Complications and Sequelae of Suppurative Bronchopneumonia

General Remarks Dr. H. Neuhof

The cases to be presented this afternoon exemplify some of the pulmonopleural complications and sequelae of suppurative bronchopneumonia. By the latter is meant involvement of a portion of the lung in a suppurative and oft-times destructive process. Suppurative bronchopneumonia may be caused by a variety of organisms. The *anaerobic* group, producing a putrid abscess of the lung, is omitted from discussion because the lesion is a distinct pathological process with but little resemblance to the ordinary suppurative bronchopneumonia. The *staphylococcic* group is also omitted because the cases ordinarily do not conform clinically to the picture of suppurative bronchopneumonia. There remain the *pneumococcic* group and the *streptococcic* group which are the subjects for discussion this afternoon. As a result of pulmonary suppuration produced by these organisms, there may develop an actual well-defined pulmonary abscess or more frequently a more or less diffuse lesion. In either case rupture into the pleural cavity can occur, resulting in an encapsulated pyopneumothorax or in a diffuse invasion of the pleural cavity. In other instances, actual rupture need not occur to account for a complicating empyema. Finally, the pleural complication may be a rapidly increasing seropurulent effusion with pronounced displacement of the mediastinum, resulting in severe respiratory distress. This is particularly characteristic of the streptococcic group.

Persistence of the bronchopneumonic process may also lead to other pulmonary complications, notably to involvement of other portions of the same lung or of the opposite lung, or later to interstitial pneumonitis and bronchiectasis.

Case 1. Suppurative bronchopneumonia of moderate severity, mild bronchiectasis, spontaneous recession. Dr. I. S. Shapiro

L. S., #362057. A boy of 16 developed an upper respiratory infection three weeks before admission. At the onset there were fever and dry cough. Improvement set in after a week, and the boy returned to school. He then had a paroxysm of coughing and soon began to expectorate thick, yellowish-green, purulent sputum. He was found to have a temperature of 104°F. About ten days before admission he began to run a spiking fever that ranged up to 103° and 104°F., and continued to cough and expectorate purulent sputum.

On admission to the hospital there was physical and roentgenologic evidence of pulmonary infiltration in both lower lobes, more marked on the right side.

During the hospital stay, the fever subsided slowly. However, the persistence of cough and purulent expectoration suggested the development of bronchiectasis. A bronchogram demonstrated definitive globular terminal dilatations of the anterior descending branches of the right lower lobe bronchus (Fig. 1).

Cough and expectoration continued for a few weeks after the bronchogram was made and then subsided gradually. The patient was discharged from the hospital symptom-free and has remained so.

A follow-up bronchogram, taken a year later, revealed a perfectly normal bronchial tree (Fig. 2).

Comment. The case demonstrates the development of mild bronchiectasis during the course of a suppurative bronchopneumonia and its subsequent spontaneous subsidence. Obviously it had not as yet reached the stage of bronchial destruction; otherwise some permanent changes would have been demonstrated in the follow-up bronchogram. It seems warranted to assume that bronchiectasis of this type not infrequently exists in the more prolonged forms of suppurative bronchopneumonia.



FIG. 1



FIG. 2

FIG. 1. Case 1. L. S. Bronchogram demonstrating globular terminal dilatations of right lower lobe bronchus, occurring as a sequel to suppurative bronchopneumonia.

FIG. 2. Case 1. Bronchogram 15 months later. Note complete disappearance of evidence of bronchiectasis in the right lower lobe.

Case 2. Suppurative bronchopneumonia of mild severity, pronounced pleural reaction.
Dr. I. S. Shapiro

E. D., #387594. A woman of 28 years became ill one week before admission and suffered repeated chills, high fever, and severe pain in the region of the right chest anteriorly. These manifestations subsided after a few days, but recurred on the day of admission to the hospital.

At the time of admission there was evidence, both on physical and x-ray examination, of an effusion in the right pleural cavity.

The pleural effusion was evacuated by aspiration shortly after admission but soon re-accumulated and required a second removal. On both occasions the fluid was found to be sterile. After the second aspiration the existence of an extensive pulmonary infiltration, characteristic of suppurative bronchopneumonia, was noted in the roentgen film. Infiltration thereafter subsided progressively, and the patient made an uneventful recovery.

Comment. The pleural reaction was an outstanding feature of the clinical course and in this particular instance in all probability would have subsided spontaneously.

Case 3. Suppurative bronchopneumonia, extensive destruction of pulmonary parenchyma, multiple cavitation, spontaneous recovery. Dr. K. Berliner

S. L., #376036. A 39 year old man had been ill for four weeks prior to admission. Fever ranging to 102°F., cough, and persistent sputum which was blood-streaked from time to time, were the outstanding symptoms.

It was interesting to note on admission that although the physical signs of a pulmonary lesion were scanty, the radiographic examination disclosed numerous infiltrations throughout the mid-fields of both lungs, several of these already showing definitive cavitation at the time of admission (Fig. 3).



FIG. 3



FIG. 4

FIG. 3. Case 3. S. L. Suppurative bronchopneumonia with infiltration and cavity formation in both lungs.

FIG. 4. Case 3. One year later. Note complete resolution and disappearance of cavities.

During the patient's five weeks hospital stay, several additional areas of cavitation appeared. The stage of resolution then set in and could be followed by successive roentgenograms. The cavities disappeared, pulmonary infiltration subsided, and the sites of cavitation were ultimately represented only by strands of fibrotic tissue. In view of the multiple areas of pulmonary cavitation, search was made for the Friedlander bacillus and the tubercle bacillus but such examinations were negative, the sputum only containing streptococcus viridans, staphylococcus aureus and albus, and diphtheroid bacillus. One year later an x-ray of the chest showed complete disappearance of pulmonary infiltration, both lungs being entirely free of any abnormality (Fig. 4).

Comment. The spontaneous disappearance of numerous areas of pulmonary cavitation, many of them of large size, indicates that the destructive nature of suppurative bronchopneumonia at times may be relatively bland.

Case 4. Suppurative bronchopneumonia, extensive destruction of pulmonary parenchyma, multiple cavitation, multiple invasion of pleural cavity. Dr. H. Neuhof

M. H., ✱348206. This case is presented briefly as a corollary to the preceding one, in order to demonstrate that, whereas in one instance spontaneous disappearance of various areas of pulmonary cavitation occurs, in others rupture into the pleura takes place. In this case, as concerns other areas of cavitation in the lung, however, spontaneous subsidence occurred in them as it did in the preceding one. The history will not be detailed since it corresponds to that of the preceding case. On admission several areas of pulmonary cavitation were visible on the roentgen film. One on the right side already had ruptured into the pleura with the production of a rather bland form of pyopneumothorax. At the same time there was also evidence of rupture of a similar focus in the left lower lobe (Fig. 5). At operation on the right side a collection of pus and air was evacuated with prompt subsidence

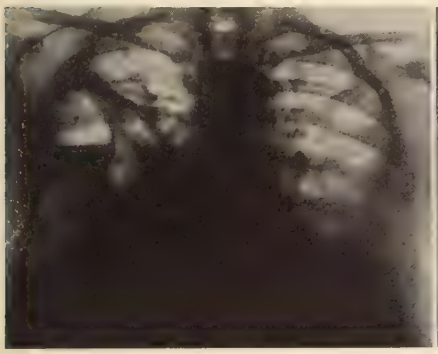


FIG. 5

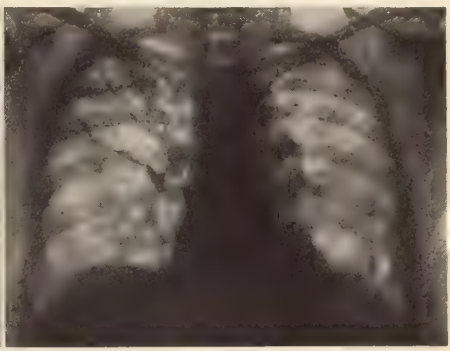


FIG. 6

FIG. 5. Case 4. M. H. Suppurative bronchopneumonia with multiple cavity formation and bilateral pleural suppuration.

FIG. 6. Case 4. Two weeks later (after drainage of bilateral pleural infections). Note marked reduction in extent and degree of pulmonary infiltration. Note resection of fourth rib anteriorly on right side and eighth rib posteriorly on left side.

of the pleural infection. Several days later the left side was operated upon with a similar result. Of interest is the fact that the various areas of pulmonary cavitation which existed in the upper and lower lobes on both sides disappeared spontaneously within a few weeks (Fig. 6).

Case 5. Unilateral chronic suppurative bronchopneumonia, bronchiectasis, pneumothorax therapy. Dr. H. Hennell

L. W., ✱388966. A boy, 4 years old, was admitted to the hospital eight months after a post-measles pneumonitis involving the right lung. During these eight months there had been repeated febrile episodes. Throughout this period there was more or less continuous cough and expectoration of large amounts of purulent sputum. The latter increased progressively so that at the time of admission there was daily expectoration of several ounces of pus.

On admission roentgen examination disclosed extensive involvement with reduction in the size of the right lower lobe. A bronchogram demonstrated pronounced bronchiectasis of all branches of the right lower lobe bronchi.

In order to relax the lobe and release the high negative intrapleural pressure, pneumothorax was induced. Marked improvement was noted at once; fever ceased abruptly, and cough and persistent expectoration subsided markedly. Repeated pneumothorax therapy did not result in complete freeing of the lower lobe because of adhesions to the diaphragm. Accordingly, phrenicectomy was performed in an effort to obtain maximum release of the right lower lobe. At the present time, five weeks after the institution of pneumothorax therapy, there remain some cough and the expectoration of small quantities of pus. The final result

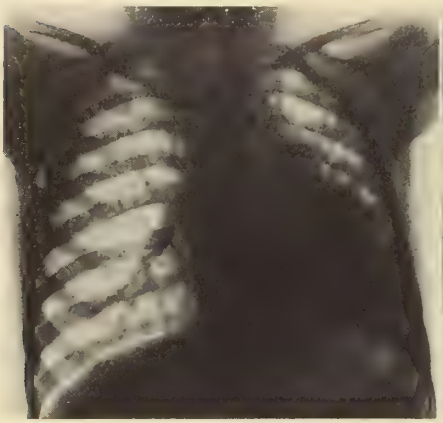


FIG. 7



FIG. 8

FIG. 7. Case 6. J. D. Advanced bronchiectasis of left lower lobe as a sequel to suppurative bronchopneumonia. Note associated atelectasis as evidenced by displacement of lower end of trachea and the heart toward the left side, elevation of left diaphragm, and narrowing of intercostal spaces.

FIG. 8. Case 6. Four weeks after instituting pneumothorax therapy. Note collapse of the involved lobe. As the result of reducing the high negative intrapleural pressure, the heart and trachea have returned to their normal position.

can not be predicted at the present time. What may occur is best illustrated by the following case.

Case 6. Unilateral chronic suppurative bronchopneumonia following aspiration of foreign body, of two years' duration. Pneumothorax therapy. Dr. H. Hennell

J. D., #378276. This 5 year old boy was admitted two years after aspirating a tooth into the left lower lobe. The foreign body was removed some time after the onset of manifestations of a suppurative bronchopneumonia. These were characterized by frequent episodes of fever, cough, and the expectoration of large amounts of purulent sputum. The removal of the foreign body did not materially influence the clinical course which was progressive. It was accompanied by the roentgenographic evidence of progressive parenchymal change in the left lower lobe.

On admission to the hospital the characteristic features of an advanced bronchiectatic lesion in the left lower lobe were noted (Fig. 7). Pneumothorax therapy was begun shortly after admission. Prompt subsidence of the clinical manifestations occurred. Treatment by pneumothorax has been continued since that time at regular intervals during the past eight months. The child has been entirely symptom-free for a period of seven months (Fig. 8).

Case 7. Suppurative bronchopneumonia complicated by large solitary abscess of the lung. Dr. A. Touroff

M. R., ♯386380. A female of 24 years was admitted to the hospital because of cough and fever of eleven days' duration. Two days after the onset, cough became productive of green, purulent, odorless sputum; and severe stabbing pain in the left axilla began. These symptoms persisted.

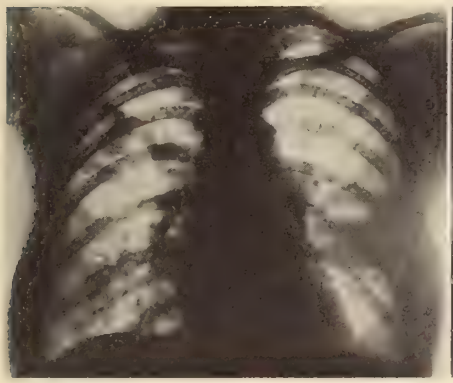


FIG. 9



FIG. 10

FIG. 9. Case 7. M. R. Suppurative bronchopneumonia complicated by abscess of lung. Note cavity with fluid level in left lung.

FIG. 10. Case 7. Two months after drainage of abscess of lung. Note resection of fifth and sixth ribs in axilla and disappearance of cavity. (Shadow in axilla is an artefact due to adhesive plaster applied to the skin.)

On admission temperature was 104°F.; cough was frequent, but sputum was scanty.

X-ray examination revealed the presence of a cavity containing a fluid level in the axillary portion of the left lung; moderate pneumonic infiltration was noted about the lesion (Fig. 9).

The diagnosis of aerobic abscess of the lung was made and confirmed by bronchoscopy which revealed non-odorous, creamy pus issuing from the axillary branch of the left upper lobe. The pus was later found to contain streptococcus viridans, staphylococcus aureus, and diphtheroids. No tubercle bacilli were found, thereby excluding the diagnosis of tuberculous cavitation.

Because of continuation of temperature (101°F. to 104°F.) and a tendency of the pneumonic infiltration to extend, operation was performed one week after admission. Through a postero-lateral approach the sixth rib was partially excised

and dense pleural adhesions encountered. An abscess cavity, about three inches in diameter, was entered, unroofed, and packed in one stage. Following operation the patient had a slow but uninterrupted convalescence. At the time of discharge, five weeks after operation, pulmonary infiltrations had practically disappeared (Fig. 10). At the present time, four months after operation, she is symptom-free and x-ray of the chest is negative.

Case 8. Suppurative bronchopneumonia complicated by large solitary abscess of the lung. Perforation of abscess with formation of localized pyopneumothorax. Dr. A. Touroff

I. H., #382934. A male, 11 months of age, was admitted to the hospital because of cough and fever of five days' duration.



FIG. 11 FIG. 12

FIG. 11. Case 8. I. H. Suppurative bronchopneumonia complicated by large abscess of right upper lobe which has perforated into the pleura producing an encapsulated pyopneumothorax. The multiple fluid levels lie partially within the lung and partially within the pleura.

FIG. 12. Case 8. Two years later. Film negative except for a shadow in the region of the right hilus. The exact nature of this shadow is uncertain.

On admission, temperature was 104°F. and cough was frequent but non-productive. The patient was acutely ill. Typical physical signs of pneumonia involving the right upper lobe were present.

At the end of eight days, during which temperature continued to range between 100°F. and 104°F., signs of localized pleural effusion were noted over the right upper lobe. Immediate x-ray examination now disclosed the presence of a large multilocular abscess of the lung which obviously had perforated into the pleura producing a localized pyopneumothorax (Fig. 11).

At operation through a posterior approach, the fourth and fifth ribs were partially resected and an encapsulated pyopneumothorax entered and evacuated. The latter communicated with a large multilocular pulmonary cavity which lay in the right upper lobe. Its interior presented numerous bronchial fistulae. After all pus and detritus had been evacuated and the pulmonary lesion had been adequately unroofed, the entire cavity was packed with iodoform gauze.

Convalescence, after plastic closure had been effected several weeks after operation, was uneventful. A recent follow-up (two years after operation) reveals the

patient to be well. X-ray of the chest is negative, except for the presence of a shadow at the right hilus, the exact nature of which has not been determined (Fig. 12).

Case 9. Suppurative bronchopneumonia complicated by multiple small abscesses of the lung. Perforation of abscesses with formation of multiple pyopneumothoraces. Operation. Persistent postoperative pleuropulmonary cavity ("Gitterlunge").
Dr. A. Touroff

C. G., #389584. A female, 5½ years of age, was admitted to the hospital because of fever, cough, and malaise of five days' duration. Two days before admission, severe pain in the right chest associated with dyspnea and cyanosis was noted.

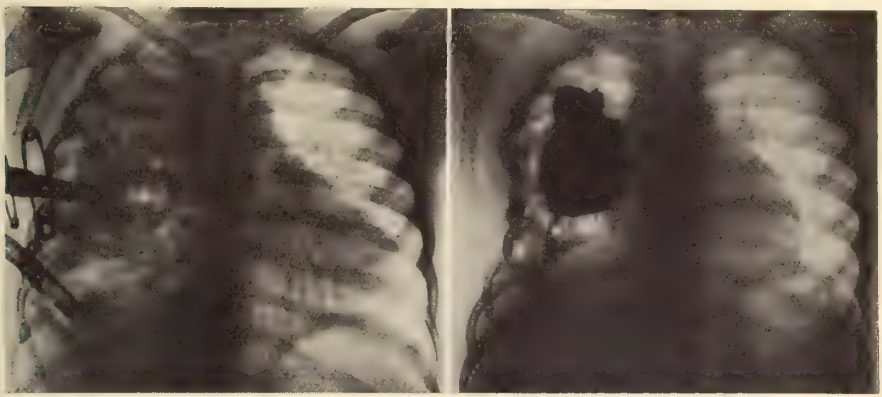


FIG. 13 FIG. 14

FIG. 13. Case 9. C. G. Suppurative bronchopneumonia complicated by multiple abscesses of the lung and pleural infection. Film after closed drainage of pleural infection. Note drained empyema cavity. Note, particularly, numerous small areas of cavitation within the lung.

FIG. 14. Case 9. Two years postoperative. Film after injection of small sinus tract with lipiodol. The latter entered a large pleuropulmonary cavity. Note that lipiodol has also entered some of the bronchial fistulae and has passed upward into the trachea.

On admission, temperature was 105°F. and the patient was urgently dyspneic and cyanotic. Signs of a large effusion in the right chest were present. The heart and mediastinum were markedly displaced to the left.

Closed drainage was performed immediately. This was followed four days later by closed drainage of an adjacent encapsulation which had not been evacuated by the first operation. Following the second procedure the patient's condition improved markedly. X-ray examination revealed that the pleural effusion had been drained completely. The underlying lung was now visualized for the first time and was found to contain numerous small cavities varying in diameter from ½ to 1½ cm. (Fig. 13). It was evident that perforation of several of these cavities had caused the encapsulated purulent collections within the pleura.

Two weeks later, because of persistence of low-grade fever, the operative wounds were revised and the two separate pleural encapsulations converted into one. Exploration revealed numerous perforations of the lung from which large amounts of air escaped.

After a prolonged but steady convalescence, as the lung expanded, most of these perforations became sealed off. In the lower part of the lung, however, as a certain amount of necrotic pulmonary tissue sloughed away, a large defect, measuring about 6 cm. in all diameters, was produced. The interior presented the typical trabeculated surface and multiple bronchial fistulae of the so-called "gitterlunge" or lattice lung.

At the present time, almost two years after operation, the patient presents a small open wound which enters a localized intrapleural dead space. On the mesial aspect of the latter, the above-mentioned pulmonary excavation still exists, essentially unchanged. Small amounts of muco-purulent material, the result of localized bronchiectasis, still discharge from the fistulae. The problem of the closure of this persistent pleuro-pulmonary cavity is still to be solved. The case illustrates not only one of the early complications of suppurative bronchopneumonia but also one of the serious late complications (Fig. 14).

Case 10. Suppurative bronchopneumonia, para-mediastinal empyema. Mediastinal abscess. Clinical course not influenced appreciably by surgical drainage. Dr. H. Neuhof

C. E., #389265. Upon admission this patient, who had been ill for a period of two weeks with the classical picture of a suppurative bronchopneumonia, presented also the clinical evidence of a left-sided pleural effusion. The roentgen film demonstrated a large collection of fluid in the left chest. Significantly, it also demonstrated an area of pulmonary infiltration in the left lower lobe (Fig. 15). On aspiration there was found a large collection of almost clear fluid in the left pleural cavity. Following this procedure a localized para-mediastinal shadow in the roentgen film was disclosed. This led to the exploration and drainage of a collection of pus in and about the apical portion of the lower lobe. Part of the invasion beyond the limits of this portion of the lobe was in the posterior mediastinum. Subsequently, an additional encapsulated collection of pus in the pleura was evacuated. The drainage of these various areas of suppuration did not appreciably influence the clinical course. The septic fever continued and advancing infiltration in the right upper lobe, as noted in the roentgen film, indicated further extension of suppurative bronchopneumonia in this region (Fig. 16).

Comment. It is my impression that this case falls in the group of suppurative bronchopneumonias in which bilateral and extensive areas of suppuration usually lead to a fatal issue. In a number of these cases operation has been performed for the drainage of a complicating empyema or pyopneumothorax and autopsy has shown that the cause of death in these cases was not the complicating pleural invasion but extensive, usually bilateral, areas of pulmonary suppuration. These may appear in the form of scattered areas of suppurative bronchopneumonia or in large, more or less confluent collections of pus in the lung. In our experience with this type, which may be called the fatal type of suppurative bronchopneumonia, the autopsy examination usually shows that the lesions are bilateral.

Anatomical demonstration. Four specimens removed at post-mortem examination, illustrating various types and complications of suppurative bronchopneumonia. Dr. C. B. Rabin

The first case was that of a lung with influenzal pneumonia, six days after the onset of the disease (Fig. 17). The specimen presented the typical hemorrhagic pneumonia and necrotizing tracheitis and bronchitis that occur in influenza. In addition, there were scattered throughout the cut section of the lung numerous small, round, grayish-yellow areas representing various stages of necrosis and purulent transformation. Within the center of these could be seen the lumina of small bronchi. This case illustrated the early occurrence of suppuration in influ-

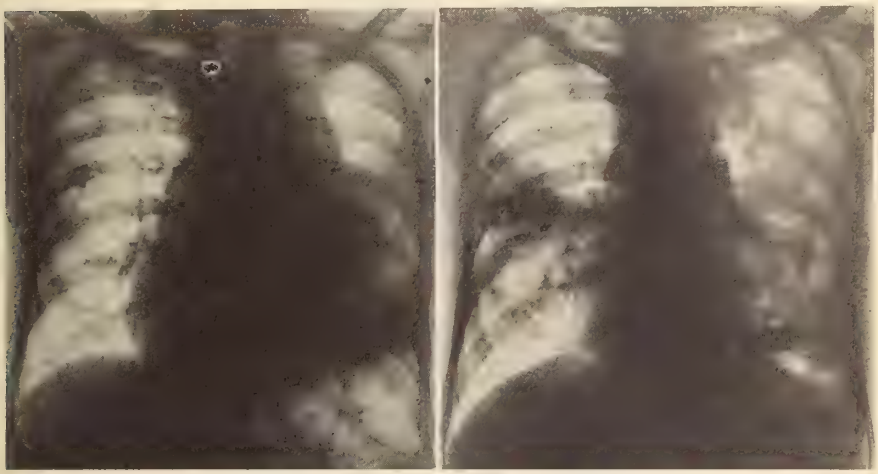


FIG. 15 FIG. 16

FIG. 15. Case 10. C. E. Suppurative bronchopneumonia complicated by encapsulated para-mediastinal and parietal collections of pus in left chest. Note that right lung is uninvolved.

FIG. 16. Case 10. Two weeks later. Pleural infections have been drained. Note that the underlying lung is still infiltrated. Also note that the right lung is now involved.

enzal bronchopneumonia and the proximity of the severest pulmonary lesions to the walls of the bronchi which are most extensively involved.

The second specimen showed a few small foci of suppurative bronchopneumonia. One focus, superficially situated and measuring about 1 cm. in diameter, had softened completely and discharged its contents through a small perforation into the pleural cavity causing an extensive empyema. In this case the pleural infection played the predominant rôle in the disease while the suppurative bronchopneumonia remained insignificant.

The third case was one of suppurative bronchopneumonia of many weeks' duration. The patient had been operated upon for an empyema but the inflammation of the lung persisted, and the specimen showed a consolidation of the entire lower lobe of the lung. This was quite firm, but on section a large amount of purulent



FIG. 17. Suppurative pneumonia in a case of influenza of six days' duration. Note the discrete areas of necrosis and suppuration about the small bronchi.



FIG. 18. Large, solitary, non-putrid abscess—an unusual complication of suppurative bronchopneumonia. Within the cavity situated just above the long fissure, there is an almost completely separated slough of necrotic inflamed lung.

material exuded from the cut surface. On closer inspection one could see that the various lobules of the involved lobe presented different degrees of suppuration and of organization. The lobules were separated by markedly thickened and indurated interlobular septa, indicating, on gross examination, the interstitial nature of the process. Under the microscope the latter could be very plainly seen to involve the interalveolar septa as well. In the center of the lobules were dilated bronchi whose lumina exuded pus and whose walls were markedly thickened by exudate. Microscopic examination of these dilated bronchi revealed marked destruction of the muscular and elastic tissues of their walls. In this case the empyema was incidental, the suppurative bronchopneumonia being extensive and persistent, eventually resulting in dilatation of the bronchi.

The fourth and last specimen represented an unusual variety of suppurative bronchopneumonia (Fig. 18). It was the lung of a child who had developed a pyopneumothorax. The specimen showed a large cavity occupying the entire axillary segment of the left upper lobe. This had perforated into the pleural cavity through an opening at least 1 cm. in diameter. Within the cavity and attached loosely to its mesial wall was a necrotic slough measuring about $2\frac{1}{2}$ cm. in diameter. The axillary division of the left upper lobe bronchus entered freely into the cavity. The remainder of the posterior half of the left upper lobe showed a bronchopneumonia which, although suppurative, showed comparatively little tendency to destruction of lung tissues. Large single abscess cavities such as this are rare complications of suppurative bronchopneumonia. Since they are always in communication with a correspondingly large bronchus, a pyopneumothorax necessarily results if they rupture into the pleural cavity.

CLINICAL PATHOLOGICAL CONFERENCE

Wednesday, November 13, 1935

GEORGE BAEHR, M.D., AND PAUL KLEMPERER, M.D., *presiding*

Case 1. Cystadenocarcinoma of the pancreas (From the Medical Service of Dr. B. S. Oppenheimer)

History (Adm. 384787). A 50 year old woman developed severe cramp-like epigastric pain and vomiting eight days before admission to the hospital. At that time her physician discovered a large mass in the left upper quadrant which extended 4 cm. below the left costal margin. On the following day the mass felt smaller, and two days later it had completely disappeared. She was admitted to the hospital on February 25, 1933, complaining of persistent epigastric pain, vomiting and constipation.

Examination. There was slight abdominal distension and left upper quadrant and epigastric tenderness. The hemoglobin was 88 per cent. The white blood count was 5,000 cells with 56 per cent polymorphonuclear leucocytes and 11 per cent eosinophils. The blood sugar was 110 mg. The blood amylase was 6.4 units. The Rehfuss test-meal revealed absence of free hydrochloric acid until histamine was administered. Histamine caused a rise of free acid to 16. The gastro-intestinal X-ray series showed a prepyloric spasm but gave no definite evidence of an intrinsic lesion in the stomach, duodenum or small bowel. The stomach seemed somewhat displaced to the right by an extrinsic mass. The stool contained no ova or parasites and was guaiac negative.

Course. The patient continued to have mild pains in the left upper quadrant. The diagnosis of pyloric stenosis due to neoplasm of the stomach was suspected. On one occasion a firm, smooth mass was palpable underneath the left costal border. It was described as being attached to the posterior abdominal wall and as not moving with respiration. In view of its previous disappearance, the possibilities of an emptying left hydronephrosis or a pancreatic cyst were mentioned. A fixed ectopic spleen was also suggested. Roentgen studies with Bucky film did not outline the mass. Finally a pneumoperitoneum was ordered as an aid in the differential diagnosis of the abdominal neoplasm, but the patient refused to remain in the hospital.

Second Admission. After discharge, the patient was seen repeatedly in the hospital Out-Patient Department and in the Follow-Up Clinic. She continued to complain of frequent postprandial vomiting and abdominal cramps. Notwithstanding these symptoms, she gained thirty to forty pounds in weight. The mass, which at first was vaguely palpable, finally became definitely palpable; the intravenous pyelogram demonstrated normal kidneys; several blood counts revealed a persistent eosinophilia ranging between 5 and 10 per cent. During the five months preceding her readmission to the hospital, she lost forty pounds in weight.

She reëntered the hospital on September 23, 1935, complaining of gradually in-

creasing asthenia, anorexia, loss of weight, vomiting, abdominal pains and constipation, with the development of fever during the last four weeks.

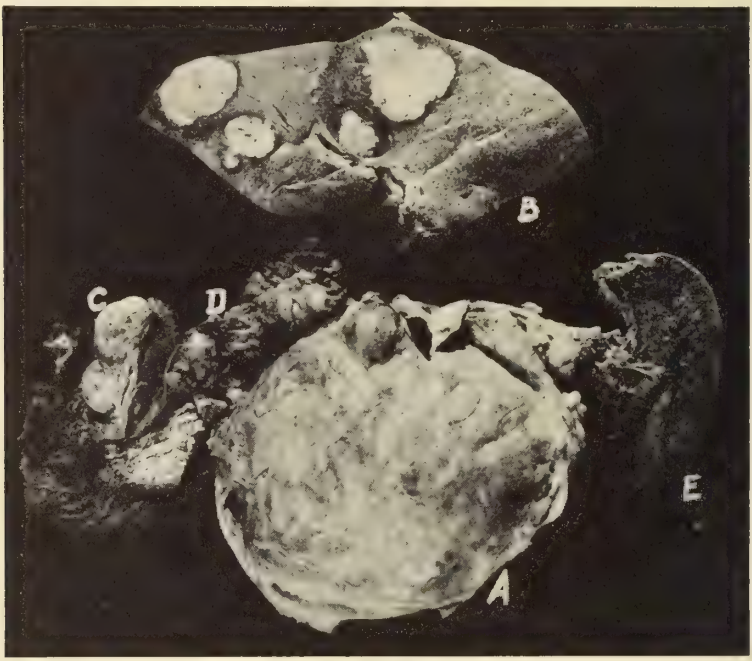
She appeared chronically ill. The temperature was 102.4°F. She weighed fifty pounds less than on her previous admission. There was a systolic murmur at the apex. The blood pressure was 100 systolic and 55 diastolic. The liver was enlarged and tender. Its firm smooth edge was palpable three fingers below the costal margin. In the left upper quadrant there was a large, smooth, firm, tender mass, the lower edge of which reached the level of the umbilicus and moved with respiration. Except for small discrete inguinal nodes, there was no significant lymphadenopathy.

The hemoglobin was 75 per cent. The red blood cell count was 4,560,000 and the leucocyte count was 15,000 with 64 per cent polymorphonuclear leucocytes, 21 per cent lymphocytes, 6 per cent monocytes and 9 per cent eosinophils. The guaiac test of the stool was slightly positive. No ova or parasites were present. The urine showed one plus albumin, and on one occasion a glycosuria (2.4 per cent) was present. The sedimentation time was 1 hour and 25 minutes. The blood chemistry findings were 85 mg. sugar, 540 mg. chlorides, less than 1 unit amylase, 160 mg. cholesterol, and 9 icteric index. The Wassermann test was negative. The echinococcus skin tests were negative. X-ray examination of the chest showed evidence of enlargement of the mediastinal nodes and that of the abdomen revealed a large mass in the left upper quadrant, the lower pole reaching the crest of the ilium. Because the upper border of this mass appeared to be at some distance from the diaphragm, the roentgenologists felt that the mass was not an enlarged spleen. The pneumoperitoneum confirmed their opinion. The spleen was normal in size and position. The mass was seen to be below and mesial to the spleen and independent of it. A gastro-intestinal series was attempted but could not be completed. A left retrograde pyelogram revealed no abnormalities of the kidney or ureter.

During the early observation on the ward, the diagnosis of echinococcus disease of the spleen was favored over that of lymphogranulomatosis, particularly in view of the protracted clinical course, the persistent eosinophilia and the absence of adenopathy. However, roentgen investigations after creation of a pneumoperitoneum established the presence of a normal spleen. The mass was then thought to be either a tumor or cyst of the pancreas of mesentery, especially in view of the high blood amylase during her first admission. The fever, which was previously unexplained, was now attributed to either torsion or degeneration of the mass. The patient's condition declined. Her temperature fluctuated between 100° and 102°F., occasionally reaching as high as 103°F. She became steadily weaker and vomited frequently. Surgical intervention was suggested, but her general condition became so poor that operative interference was thought inadvisable. Signs of bronchopneumonia appeared at both bases. The mass remained unchanged. Repeated blood counts showed a secondary anemia (60 per cent hemoglobin) and a moderate leucocytosis (17,100 and 18,700 cells). The eosinophils gradually diminished to 2 per cent. She developed a marked phlebitis and edema of the left lower extremity. Decubitus ulcers appeared on her back. She became incontinent of urine and feces, her respirations became rapid, her pulse feeble, and she died two years and ten months after the onset of her illness.

Post Mortem Findings. The body of the *pancreas* was replaced by a large firm

cystic mass of grapefruit size (see accompanying photograph). The head of the pancreas was slightly reduced in size but not distorted. The *duct of Wirsung* could be traced from the head of the pancreas to the anterior of the cyst wall where it continued for a distance of about 3 cm. and then ended abruptly. It did not appear to enter the cyst. The tail of the pancreas was only recognizable by the fact that the caudal portion of the duct, which now represented a totally obliterated lumen, was surrounded by a mass of fat and fibrous tissue. The cystic mass which was emptied of dirty gray, thick, odorless fluid had a volume of approximately 750 c.c. The cyst wall was 3 to 4 mm. thick and fibrous. Its inner aspect, which presented a dirty gray, shaggy, caked appearance, was also interrupted by granular



Case 1. (A) Cystadenocarcinoma of the body of the pancreas with metastases into (B) liver (only portion of liver shown here), (C) lymphnodes, (D) remnant of uninvolved pancreas, (E) spleen (compare size of spleen with that of the tumor).

and papillary excrescences. A thick walled, multiloculated daughter cyst of walnut size and a pea-sized cyst were also attached to the inner aspect of the main cyst wall. The splenic vessels were not compromised. Microscopic sections of the cyst wall showed adenocarcinoma. The peripancreatic nodes, the node at the junction of the cystic and common ducts and the node at the oesophageal hiatus of the diaphragm were involved by the grayish-white carcinomatous tissue. Several large (1 to 4 cm.), circular metastatic areas, some of which showed central cystic degeneration, were present in the liver. Other findings were confluent bronchopneumonia of both lower lobes and an embolus of a branch of the right pulmonary artery (probably originating from the thrombosed left femoral vein).

Comment. Dr. Baehr: According to Dr. Sobotka's observations, the blood amylase is frequently found elevated in acute pancreatitis but almost never in chronic pancreatitis. The elevation of the blood amylase to 6.4 units two and a half years ago should have suggested at that time the presence of an acute pancreatitis which, in the light of the autopsy findings, probably went on to cyst and subsequent tumor formation.

On referring to the history, one may be able to trace the sequence of events in this case. The attack of pain two and a half years ago may have followed an acute hemorrhagic pancreatitis with subsequent pseudo-cyst formation. This would readily account for the earlier elevated blood amylase figure. On the other hand it is possible that the patient had a primary cyst and that the episode of pain during her first admission resulted from hemorrhage into the cyst wall.

Dr. Klemperer: Although transformation of a benign tumor to a malignant one is rare, it appears that in this instance the carcinoma developed within a long-standing primary benign cyst. Although the original epithelial cyst lining was not apparent, the presence of papillary excrescences and the size of the cyst suggest that the carcinoma originated from a cystadenoma rather than from a pseudo-cyst, as suggested by Dr. Baehr. In other words a true cystadenoma was probably transformed after a period of years into a cystadenocarcinoma.

Doctor in the audience: What was the cause of the eosinophilia?

Dr. Baehr: That is difficult to say. Because of the eosinophilia we suspected Hodgkin's or Echinococcus disease clinically. It is possible, however, that this patient may have been infested with intestinal parasites.

Dr. Klemperer: Malignant tumors may often cause eosinophilia.

Doctor in the audience: Could this patient have been operated upon about two and a half years ago and her life saved?

Dr. Baehr: Had the diagnosis been made at that time, removal of the tumor might have been attempted.

Dr. Klemperer: It is best not to attempt surgery in tumors involving the body of the pancreas because of the difficulty such a procedure presents. Recently a case of that nature came to my attention. A diagnosis of malignant tumor of the body of the pancreas was made and it was removed surgically. On histological examination, the tumor proved to be benign, but the patient succumbed to post-operative complications. Since tumors in that locality may be benign and since a high mortality attends surgery of the pancreas, my opinion is that it is best to leave them alone. Tumors situated in the tail of the pancreas can be coped with successfully, and hence there is no real contraindication to their surgical excision.

Dr. Baehr: Dr. A. O. Whipple has successfully resected carcinomata of the head of the pancreas in patients on whom a preliminary cholecystgastrostomy and gastro-enterostomy had been done as a preliminary first stage operation.

Case 2. Chronic diffuse glomerulonephritis (end stage with atrophy) (From the Medical Service of Dr. B. S. Oppenheimer)

History (Adm. 383722). A 32 year old Porto Rican had jaundice in Panama twelve years ago and an episode of sore throat, lumbago and fever nine years later. He underwent a thorough army physical examination three years ago and was declared to be in excellent health. One year ago he was rejected by an insurance company without being informed of any blood pressure or urinary abnormalities.

His present illness dates back to three months ago when he became unconscious for a few minutes while warming up motors in a garage. He vomited considerably and was regarded as suffering from "gas poisoning." Since that time he developed asthenia, fatigability, breathlessness on exertion, recurring frontal headache, epistaxis, nausea and vomiting. Five days before admission he suddenly became aware of his inability to read fine print. He entered the hospital on April 12, 1935.

Examination. The patient appeared chronically ill. His fundi showed bilateral papilledema, numerous linear hemorrhages, whitish fibrinous exudates and narrow and tortuous arteries. The lungs were clear. The heart was markedly enlarged to the left. The first sound was loud and booming at the apex. A blowing basal systolic murmur was audible. The second aortic and pulmonic sounds were of equal intensity. The radial vessels were markedly sclerosed. The arterial blood pressure was 190 systolic and 124 diastolic. The venous pressure was 10 cm. of blood.

The hemoglobin was 60 per cent. The white blood count was 8,000 with 68 per cent polymorphonuclear leucocytes. The urine showed one to two plus albumin and isolated white blood cells. On one occasion a few red blood cells were seen. There was a fixation of the specific gravity of the urine at 1.008 to 1.010. The blood chemistry determinations were 90 mg. urea N., 595 mg. chlorides, 6 mg. creatinine, 235 mg. cholesterol, 9.4 mg. calcium and 4.1 mg. phosphorus. The blood Wassermann test was negative. An electrocardiogram showed left ventricular preponderance, high voltage and slurring of the QRS complex.

Course. A spinal tap was done, and it yielded clear fluid under an initial pressure of 195 mm. of water. After removal of 15 c.c. of fluid the pressure dropped to 100 mm. More fluid was removed until the intrathecal pressure was lowered to 70 mm. The Wassermann test was subsequently reported as negative. Two days later the patient felt subjectively improved and his amblyopia diminished. The fundi remained unchanged although his vision improved considerably. He became ambulatory and left the hospital after a second lumbar tap was performed. When he was discharged, he was regarded as suffering from malignant nephrosclerosis although the possibility of the terminal stage of chronic glomerulonephritis was not definitely excluded.

Second Admission. Two days after discharge from this hospital, the patient was admitted to another institution because of the recurrence of the symptoms. At this time he also complained of sharp, intermittent, lumbar pain which radiated down both lower extremities. At the end of twenty days he was discharged subjectively improved. He remained apparently well for the following three or four months. Seven days before he was readmitted to this hospital he again became nauseated, vomited, developed malaise, marked amblyopia, insomnia and pain in his extremities. This was followed by progressively increasing dyspnea and orthopnea. Two days before admission he developed abdominal cramps which were accompanied by several loose bowel movements.

On admission, he was found to be markedly emaciated and dehydrated. There was brownish pigmentation of the skin as seen in moderately advanced Addison's disease. His mucous membranes were very pale. His breath was uremic. He was orthopneic, and his respirations were slow and deep. The fundi showed grayish and swollen discs with obliteration of the disc margins and considerable peripapillary edema. Both macular areas were involved by the edema. There were

scattered hemorrhages and exudates. The veins were full. The arteries were narrowed, irregular, tortuous and showed arteriovenous compression. The cervical veins were engorged. Medium moist râles were audible at the lung bases. The heart was enlarged. Loud snapping heart sounds and a loud blowing systolic murmur were heard at the apex. The second pulmonic sound was accentuated and louder than the second aortic sound. Frequent extrasystoles were present. The liver was enlarged two fingers below the costal margin. The arterial blood pressure was 210 systolic and 130 diastolic. The venous pressure was 17.2 cm. of blood.

The hemoglobin was 36 per cent; the red blood count was 2,050,000, and the white blood count was 8,700 with 80 per cent polymorphonuclear leucocytes. The urine had a specific gravity of 1.012 and showed one to two plus albumin and occasional erythrocytes. The blood chemistry findings were: urea nitrogen, 153; creatinine, 20 mg.; carbon dioxide combining power, 28 volumes per cent; calcium, 10 mg. and phosphorus, 6.5 mg. An electrocardiogram revealed high voltage slurred QRS complexes without definite axis deviation.

The clinical diagnosis was: terminal stage of malignant hypertension, uremia and cardiac failure. The patient grew steadily weaker. His uremic symptoms were complicated by circulatory failure. He developed Cheyne-Stokes breathing, a pericardial friction rub and gallop rhythm. The blood urea nitrogen rose rapidly to 180 mg. He died in pulmonary edema six days after admission.

Post Mortem Findings. The *kidneys* showed extreme atrophy, being approximately equal in size, and together weighed 80 grams. The capsule was somewhat thickened and stripped readily except at the lower pole where vessels passing in from the capsule hindered its separation from the renal surface. The surface, which was yellowish-red in color, was marked by numerous small, irregular and coarse granulations. The yellowish color was derived from the raised granulation whereas the red color owed its origin to the depressed areas between the granulations. Towards the lower pole where the granules were larger the yellowish color predominated. The kidneys were very firm and offered leathery resistance to the knife. On section the cortex was moderately reduced in width and yellowish in color. The glomeruli were distinguishable as gray-red dots. Microscopic sections of the kidneys showed numerous fibrotic glomeruli, some that appeared normal and others that still showed histologic evidence of intracapillary glomerulitis. Microscopic sections of the *pancreas* showed arteriolonecrosis of some of the smaller arterioles. The *heart* displayed concentric hypertrophy of the left ventricle, hypertrophy of the right ventricle, and bulging of the interventricular septum to the right with consequent reduction in the volume capacity of the right ventricle. There was also a severe hyperemia of the *gastro-intestinal tract* with occasional zones of submucosal hemorrhage most marked in the terminal ileum and transverse colon.

Comment. Dr. Baehr: This case may be included with the cases of acute and subacute nephritis with extrarenal vascular involvement which were presented at the Clinical Pathological Conference on November 6, 1935 (J. Mt. Sinai Hosp. 2: 282, 1936). The case is of interest not only pathologically but also clinically since it emphasizes the difficulty in the differential diagnosis between the terminal stages of chronic glomerulonephritis and malignant nephrosclerosis. The antemortem diagnosis of malignant hypertension was probably suggested by the absence of a

nephritic history, by the fact that three years ago he passed a thorough physical examination, by the markedly elevated blood pressure, and by the classical eyeground changes of hypertensive neuroretinopathy. Furthermore, his illness was short, appearing objectively for the first time one year ago when he was refused insurance. In view of subsequent developments his so-called attack of "carbon monoxide poisoning" may be regarded as a manifestation of either uremia or hypertensive encephalopathy.

Dr. Klemperer: The kidneys in malignant nephrosclerosis may become smaller but they seldom atrophy to the degree found in this case. The presence of arteriolonecrosis in the pancreas is not unusual, since severe extrarenal arterial lesions may be found not only in the acute and subacute varieties of nephritis, but also in the chronic form. In view of the history it appears likely that the chronic phase developed rapidly in this patient and that the acute nephritis was only of brief duration.

Dr. Baehr: Acute glomerulonephritis may be followed by a silent phase lasting for years. Ultimately, extensive vascular lesions may develop in the chronically damaged kidneys, reducing the parenchyma to such an extent that arterial hypertension and azotemia finally ensue. The resulting clinical picture is then indistinguishable from the clinical manifestations of the primary contracted kidney of essential hypertension. Only the early history of an acute glomerulonephritis, if present, may give a clue to the differential diagnosis. As this case demonstrates, the terminal symptoms in both types of renal disease may be identical, even to the eyeground changes and other manifestations of the so-called malignant phase of this systemic vascular disease.

Case 3. Atrophic (Laënnec) cirrhosis in an alcoholic with myocardial degeneration
(From the Medical Service of Dr. George Baehr)

History (Adm. 385347). A 69 year old man gave a history of having had a chancre at the age of 19 years, which was treated by cautery. Until about five years ago he drank about two pints of whiskey and as much as twelve bottles of beer daily. His past history included occasional attacks of jaundice and glycosuria. Nine months ago he began to suffer from recurring attacks of precordial pain of increasing severity. These attacks, which usually followed physical exertion, were accompanied by progressively increasing dyspnea and orthopnea. An electrocardiogram taken three months later revealed delayed A-V conduction time (0.28 sec.) and intraventricular block. Ten days ago he developed dull epigastric pain and occasional vomiting. For three days prior to admission he noted tarry stools. Two days ago he suffered an attack of agonizing precordial pain, severe dyspnea, prostration and continuous vomiting.

Examination. The patient was moderately dyspneic and cyanotic. The sclerae were subicteric. The pupils reacted sluggishly to light and in accommodation. Scattered râles were audible over both lung bases. The heart was moderately enlarged to the left. A harsh systolic murmur, audible over the entire precordium, was loudest at the aortic area. The heart sounds were of poor quality. The second aortic was louder than the second pulmonic sound. The arterial pressure was 90 systolic and 65 diastolic. The venous pressure was 8 cm. It rose to 12 cm. on

right upper quadrant compression. The liver was tender and firm. Its edge was palpable three fingers below the costal margin.

The saccharin circulation time was 27 seconds. The vital capacity was 160 c.c. The urine had a specific gravity of 1.020. There was one plus acetonuria without coexisting glycosuria. The blood chemistry showed 50 mg. urea, 220 mg. sugar, 540 mg. chlorides, and 30.5 volumes per cent carbon dioxide.

Course. The blood pressure remained low, the systolic being 80 and the diastolic 54. The pulse rate was 80. Twenty-one hours after admission the patient developed Cheyne-Stokes respiration. His heart sounds became almost inaudible, and he suddenly ceased breathing.

Post Mortem Findings. The *liver* weighed 1700 gm. Its surface was yellowish-tan in color and finely granular. The brown or yellowish-brown granules varied in size from pin-head to 0.5 cm. in diameter. These areas were slightly elevated, firm and surrounded by thin zones of grayish or grayish-red translucent tissue. The liver cut with considerable resistance. On section, granules similar to the surface granules were seen. The normal lobular structure could not be made out. The walls of the portal vein and its radicles were thickened. Frozen sections of the liver showed cirrhosis of the liver with fatty infiltration. The *spleen* was not enlarged, weighing 125 gm. The *myocardium* of both ventricles was soft and showed zones of gray and yellow streaking. Some of the yellow zones were partly surrounded by thin, brownish-purple zones. The *papillary muscles* were enlarged and mottled with gray and yellowish patches. Frozen sections of the myocardium showed interstitial foci of polynuclear infiltration of varying size. These were particularly prominent in the papillary muscles. There was also marked calcification with stenosis of the aortic valve. The *stomach* showed catarrhal gastritis, and an oval, flat, infiltrating carcinoma occupied its fundal portion. Other findings were pulmonary emphysema and "sabre scabbard" trachea.

Comment. Dr. Klemperer: Of unusual interest in this case is the fatty infiltration of the myocardium which closely resembles the heart in beriberi. The patient was a decided alcoholic, and it is, therefore, very likely that the fatty changes in his heart are consequences of an avitaminosis caused by a combination of dietary deficiency and inadequate absorption of vitamin B.

The presence of a spleen of normal size in this case brings up the question of splenomegaly in atrophic cirrhosis. According to statistics, the spleen is enlarged in 76 per cent of the cases and is normal in 24 per cent.

The "sabre scabbard" trachea showed marked ossification of the cartilages. The relationship of this type of trachea to the causation of pulmonary emphysema has been discussed by some authors.

Dr. Baehr: Alcoholic multiple neuritis, like the polyneuritis of beriberi and pellagra, have been reported by Strauss of Boston to be the result of a deficiency of vitamin B. The nutritional disturbance which accompanies chronic alcoholic addiction is usually severe and, in this case, is probably the underlying cause for the fatty changes in the myocardium. The presence of tarry stools in an alcoholic should have suggested the diagnosis of Laënnec's cirrhosis clinically.

Dr. Klemperer: Although the melena may have originated from a small oesophageal varix, it is also possible that the tarry stools were caused by bleeding from the unrecognized carcinoma of the fundus of the stomach. The actual source of the bleeding could not, however, be determined at the post mortem table.

Case 4. Atrophic (Laënnec) cirrhosis with icterus (From the Medical Service of Dr. B. S. Oppenheimer)

History (Adm. 385069). A 41 year old Porto Rican had a chancre twenty-three years ago which was cauterized. Two years ago he received "injections" at another hospital. Since that time he suffered from postprandial distress, belching and occasional vomiting. Three months before admission he developed pain in the right upper quadrant, occurring most frequently after meals. He also vomited frequently and lost twenty pounds. Two months ago he noted that his eyeballs and skin were turning yellow and that his urine was dark brown. Pruritis developed three weeks ago.

Examination. The patient appeared chronically ill. His sclerae and skin had a deep icteric hue. The heart was enlarged downward and to the left. The blood pressure was 120 systolic and 84 diastolic. The abdomen was distended. Shifting dulness and a fluid wave were present. The liver was enlarged to the umbilicus, and its edge was sharp and smooth. An irregular mass palpable in the epigastrium was considered to be the left lobe of the liver. The spleen was not felt.

The hemoglobin was 72 per cent. The white blood count was 17,650 with 74 per cent segmented polymorphonuclear neutrophiles, 18 per cent non-segmented polymorphonuclear neutrophiles, 6 per cent lymphocytes and 2 per cent monocytes. The urine showed 2 plus bile and 1:5 urobilin. The stool was positive for bile and urobilin; the guaiac test was negative. The galactose tolerance test was markedly abnormal as was evidenced by the excretion of 5.4 gm. of galactose in the urine. The blood chemistry figures were urea nitrogen 7 mg., sugar 105 mg., cholesterol 160 mg., and cholesterol ester 35 mg. The icteric index was 85. The Van den Bergh test was direct positive, indirect 1:33,000, and bilirubin 3 mg. The Takata-Ara reaction was positive. The blood Wassermann test was negative and the Kahn was 1 plus. The sodium benzoate test (excretion 1.31 gm.) indicated severe liver damage. The urine was negative for tyrosine. The total blood protein was 4.6 per cent with 2.9 per cent albumin and 1.7 per cent globulin. Cultures of bile revealed streptococcus and staphylococcus albus. The electrocardiogram showed left axis deviation and slightly lowered T waves.

Course. The presence of ascites and the laboratory findings suggested a toxic hepatitis superimposed upon a cirrhotic liver. Although a Laënnec type of cirrhosis was regarded as the most likely diagnosis, the possible rôle of parasitic or luetic disease in the pathogenesis of the cirrhosis was also considered. The patient's condition declined progressively. His temperature, which fluctuated between 99° and 102°F., rose occasionally to 103°F. The leucocytosis persisted. The ascites increased. Continuous intravenous therapy was instituted. To relieve respiratory difficulty, the ascites was tapped with removal of 5 liters of bile-stained fluid. Five days later 6 liters of fluid were removed. The specific gravity of the fluid was 1.012. Although during subsequent examinations the galactose tolerance test showed less excretion (2 to 4 gm.), the icteric index dropped and the level of cholesterol ester remained unchanged. The stool became guaiac positive. In addition to rapid reaccumulation of the ascites he developed increasing edema of the lower extremities, oliguria, nausea, and somnolence. Within a short time marked oliguria became manifest; the urea nitrogen rose to 39 mg. The nausea became distressing and finally he lapsed into coma. Intravenous glucose and saline and

intramuscular liver extract failed to arouse him. He died four weeks after admission.

Post Mortem Findings. The *abdominal cavity* contained about 4000 c.c. of serosanguineous fluid. The *liver* was slightly reduced in size and weighed 1345 gm. It was firm in consistency and dark green in color. It cut with greatly increased resistance. The surface was irregular and studded with moderate sized nodular areas which gave it a uniform pebbled appearance. These nodular areas varied in color from yellow to green to dark brown. The sectioned surface was dry and firm. The normal liver architecture was either markedly distorted or completely lost. There were glistening gray strands which divided the parenchyma into small irregular areas of fairly uniform size. These areas also varied in color from yellow to green to dark brown. The portal vessels and hepatic veins were markedly thickened. Microscopic section of the liver cells showed severe polymorphonuclear infiltration. The *spleen* weighed 190 gm. and showed areas of chronic perisplenitis. On histological examination the *pancreas* showed foci of acute and chronic pancreatitis.

Comment. Dr. Baehr: Did death result from liver damage alone? The clinical sequence of events would suggest that circulatory failure contributed to his edema and his death.

Dr. Klemperer: This is a case of atrophic (Laënnec's) cirrhosis in which severe hepatosis and acute hepatitis are superimposed upon a more chronic hepatic disorder. Severe terminal icterus in such cases is solely the result of acute liver cell damage since it is rarely encountered in uncomplicated cases. Its occurrence in this patient may therefore be attributed to the extensive hepatotic and hepatitic lesions which are readily apparent in the histologic sections. Furthermore, this case also emphasizes the fact that splenomegaly is not a consistent finding in atrophic cirrhosis. The presence of acute pancreatitis is of particular significance to me. I have noted several instances of coexisting hepatic and pancreatic lesions in cases of this type.

Dr. Baehr: In view of the nativity of the patient who was a Porto Rican, of his deep jaundice, and of the widespread inflammatory lesions in the cirrhotic liver, the possibility of schistosomiasis must be considered by the pathologist.

Dr. Klemperer: Schistosoma livers are usually referred to as "pipe stem cirrhoses" due to the enormous thickening of the portal fields. This characteristic pathological alteration was not observed in this case.

Case 5. Adenocarcinoma of the uterus; carcinoma simplex of the gall-bladder (From the Surgical Service of Dr. Ralph Colp)

History (Adm. 386030). A 56 year old, white female received radium treatment for menorrhagia and metrorrhagia three years prior to admission to the hospital. She remained amenorrheic for the next two years. A year ago she began to suffer again from irregular vaginal bleeding and also from pain in the left lower quadrant. A curettage was performed with negative findings. She had lost twenty-five pounds in weight during the last three months. She was admitted to the hospital on December 26, 1933.

Examination. The uterus was enlarged and retroposed. The left parametrium was infiltrated and shortened. The sedimentation time was 19 minutes. The blood pressure was 150 systolic and 90 diastolic.

Course. A preliminary diagnostic curettage operation was performed. Histological examination of the endometrium showed adenocarcinoma. A vaginal hysterectomy was then performed, and an adenocarcinoma of the uterus was removed. Bilateral salpingitis was also present, and both tubes were resected Radiotherapy was again instituted. Convalescence was uneventful, and the patient was discharged two months after admission (February 25, 1934).

Second Admission. The patient was readmitted to the hospital ten months later (December 17, 1934). During the preceding ten months she had been suffering from recurring palpitations and during the week prior to admission she had also experienced two attacks of substernal pressure and choking. She was also conscious of a sense of pressure in the epigastrium after eating. At this time a uniformly enlarged thyroid isthmus was palpated. A marked semi-coarse tremor of the hands was present. The blood pressure was 190 systolic and 94 diastolic. The basal metabolic rate was plus 8 per cent. The blood cholesterol was 310 mg. The electrocardiogram showed left ventricular preponderance and isoelectric T waves in the third and fourth leads. The sedimentation time was 35 minutes. With rest in bed and sedatives, the arterial pressure dropped to 156 systolic and 80 diastolic. The normal basal metabolic rate ruled out the presence of thyrotoxicosis.

Third Admission. The patient was being treated for her "gall-bladder" and was apparently symptom-free until two weeks before admission, when she began to complain of moderately severe epigastric pain which radiated laterally and posteriorly to the back. It subsided, but a few days later she was seized with severe periumbilical pain. The pain finally was localized in the right lower quadrant and was accompanied by anorexia and vomiting. On admission she was acutely ill. Moderate tenderness and slight rigidity were present in the right lower quadrant. A firm mass was palpable on the right side lateral to the umbilicus. The blood pressure was 170 systolic and 104 diastolic. The white blood count was 9,200 cells with 83 per cent polymorphonuclear leucocytes.

Because of increasing rectal and right lower quadrant tenderness, acute appendicitis was considered as the most likely diagnosis. Immediate operation was performed. The appendix was removed, though it appeared grossly normal. On further exploration, a hen's egg-sized, irregular, grayish-white, hard mass was found involving the gall-bladder and invading the liver. A metastatic grayish-white nodule $\frac{1}{2}$ inch in diameter was also seen about three inches away towards the dome of the liver. On separating the stomach from the adhering gall-bladder mass, a $\frac{3}{4}$ inch orifice was detected. This was promptly closed. A cholecystostomy was performed after two dozen stones were removed. Sections of the thickened gall-bladder and metastatic nodule were taken. The subsequent report of the pathologist read as follows: "fragments of carcinoma simplex; metastatic carcinoma simplex; obliterated appendix." The postoperative course was stormy. On the day following the operation the temperature rose to 104.2°F. The pulse was 124 and the respirations were 36. The patient was very dyspneic and cyanotic. Dulness, fine râles and tubular breathing were present at the right base. Fine râles were audible also at the left base. Because of the respiratory difficulty, oxygen therapy was instituted. The temperature remained high for several days. The pulmonary signs increased until signs of frank consolidation of the right lower lobe were elicited. Abdominal tenderness and distension increased. The profuse,

unpleasant discharge in the dressings suggested a gastric leak. This was confirmed by the appearance of insoluble carmine in the wound after it had been given by mouth. Nine days after the operation the patient developed a left parotitis which was treated by radium pack. The wound also showed evidence of diffuse fascial necrosis, and the gastric leak persisted. Although the temperature dropped to a lower level, the cyanosis increased and the pulse became irregular. The patient grew steadily weaker and succumbed on the thirteenth day after the operation.

Post Mortem Findings. The right mid-rectus incision showed extensive sloughing and emitted a foul odor. Its base was covered by a foul smelling, dirty, gray material in which pieces of rectus sheath were present. The opening in the upper angle of the wound (cholecystostomy tube site) led into a small, empty cavity (portion of the gall-bladder) which was lined by congested smooth mucosa. This was directly continuous with the shrunken ampulla of the *gall-bladder* which was filled with a brown, ovoid calculus, 1 cm. in diameter. The remainder of the gall-bladder could not be identified, being part of a puckered, firm mass which on section was opaque, white and medullary. This mass filled almost the entire gall-bladder bed and was densely adherent to the liver, the pylorus and the first portion of the duodenum. On sectioning the thickened, shrunken gall-bladder, the white carcinomatous tissue could be seen extending in fan-like fashion into the *liver* substance with which it merged. Several round metastatic lesions were present within the right lobe of the liver and on its anterior and inferior aspects. The *duodenum* at a point 8 mm. from the pylorus presented a perforation 1.5 cm. in diameter. The *hepatic flexure of the colon* was adherent to the duodenum near the perforation and presented several punched-out ulcers with irregular edges which led through fistulous tracts into the duodenal perforation and into the floor of the wound. The intraperitoneal surface of the liver was covered by thin layers of a yellow and greenish-gray substance. A small amount of purulent material was present underneath the right leaf of the diaphragm. The lungs showed foci of suppurative bronchopneumonia. The old operative field in the pelvis, which one year ago was the seat of a hysterectomy for a typical uterine adenocarcinoma, was entirely clear and free from recurrences.

Comment. Dr. Klemperer: This case is of interest because of the development of a carcinoma within an atrophic fibrous gall-bladder. Another interesting feature is the presence of two unrelated carcinomas. The uterine carcinoma had been successfully and completely removed a year and a half ago.

Reported by William M. Hitzig, M.D.

ABSTRACTS

Authors' Abstracts of Papers Published Elsewhere by Members of The Mount Sinai Hospital Staff

Members of the hospital staff and the out-patient department of The Mount Sinai Hospital are invited to submit for publication in this column brief abstracts of their articles appearing in other journals.

Reactivation of the Oedipus Situation. S. Z. Orgel. Psychoanal. Quart. 3: 128, January 1934.

The author describes several incidents which have occurred outside of the analysis which were instrumental in reactivating episodes which occurred from the third to the tenth years of the patient's life and had not been recalled previously although the patient had had 330 hours of analysis.

The patient, a girl, entered analysis at the age of 22 years. She complained of persistent vomiting following the death of her brother. She had had two similar attacks, one at the age of 17 when a young man touched her genitals and the other at the age of 20 when she witnessed her brother, now dead, in an epileptic seizure.

During one of the analytic sessions, grunting noises drifted into the analytic room from a hospital ward situated in the upper part of the office building. These recalled to the patient her mother's grunting while in labor with her youngest brother when the patient was $3\frac{1}{2}$ years old. At this point the patient complained of severe abdominal pains and fantasied that she was giving birth to a child. She recalled, too, that just before entering the analytic room she had seen a picture on a magazine cover portraying a little girl playing the part of her father's wife and regarding her doll as the child. She also recalled that she began sleeping with her father at the time of the birth of her brother and continued to do so until her tenth year, that she enjoyed the close contact with her father's body. She awoke one night and found her father missing from bed and heard noises emanating from her mother's room. Her father found her crying on his return to bed, but she would not tell him the reason for her tears. At ten years of age she began sleeping with the mother and was compelled to walk into the father's room each night before retiring to make certain that he was asleep.

The reactivated material all pointed to a normal Oedipus attitude with a prolonged attachment to the father. The patient's realization of the father's rejection of her for the mother caused her to develop a vindicative attitude toward men.

NEWS AND NOTES

Supervision of Research Work

The Board of Trustees recently adopted regulations (recommended by a special committee headed by the Director of Laboratories) providing for more effective supervision of research in the hospital. The rules aim principally to provide for the registration of research problems in order to avoid the unwitting duplication of work in several departments. Supervision is in the hands of a Research Committee selected from the medical staff.

New Out-Patient Department Clinics

Clinics recently established in the Out-Patient Department include one for breast diseases and another for rectal diseases. The Breast Clinic meets on the second floor of the Out-Patient Department on Tuesday afternoons as part of the surgical clinic on Dr. Lewisohn's Service. The rectal clinic is also held on the second floor and meets on Monday, Wednesday, and Friday mornings. Both are "refer" clinics, i.e., only patients referred by other divisions of the Out-Patient Department are accepted.

Renovation of Adult Wards

The renovation of the Medical Pavilion, following similar alterations in the Surgical Pavilion, is now well advanced and will probably be completed early in May. The Isolation Roof is also being altered, and upon completion will receive private patients with contagious diseases excluded from the Hospital under the present rules. The Department of Health has approved this service for private patients. The Mount Sinai Hospital is the only hospital in New York City other than the Willard Parker to whom this permission has been given.

Mr. George Blumenthal Honored

Mr. George Blumenthal, President of the Board of Trustees of The Mount Sinai Hospital, was given the honorary degree of Doctor of Fine Arts at the Commencement Exercises of the New York University in June 1935.

Lucien Howe Gold Medal in Ophthalmology

Dr. Joseph H. Globus and Dr. Sidney M. Silverstone were awarded the Lucien Howe Gold Medal in Ophthalmology by the University of Buffalo for their paper on "Diagnostic Value of Defects in the Visual Fields and Other Ocular Disturbances."

The "3 Cents a Day" Plan of the Associated Hospital Service

The Mount Sinai Hospital is a participating member of the Associated Hospital Service plan and offers its private and semi-private facilities to certificate holders of this non-profit corporation. The rules set up for the admission and billing of these certificate holders do not affect the physician-patient private relationship.

Those interested in learning more about the service can obtain information by addressing the Associated Hospital Service, 370 Lexington Avenue, New York City.

Changes in Private and Semi-Private Pavilion Charges

Charges for a number of special examinations in the Private and Semi-Private Pavilions have been revised in the past year, most of them downward. Several new services and tests have been added. Members of the staff may familiarize themselves with these by otaining a copy of the revised "Information for Private (or Semi-Private) Patients" from the respective pavilion offices.

Flat Rate for Tonsillectomy Cases

Patients may now be admitted to the Semi-Private Pavilion for tonsillectomy at a flat rate of $17.50. This rate includes bed service up to noon of the day following admission, the use of the operating room, and routine laboratory examination. Those who stay beyond this period are charged at the regular day rate for additional time. The Board has also approved a flat charge of $12.50 for tonsillectomy in children in a private ward, when such service is established. This will also include the use of an operating room and routine laboratory work; patients who stay beyond the flat rate period will be charged $4.00 for each extra day.

Special Leg Pump Apparatus

A special leg pump apparatus has been in use for several months in the Thrombo-Angiitis Obliterans Clinic of the Out-Patient Department. It is available also for private ambulant and for private and semi-private hospital patients at fixed rates. Arrangements for the use of the apparatus may be made through the respective pavilion cashiers.

Post-Graduate Medical Courses to be Offered at the Mount Sinai Hospital*

Monday, November 2nd–Saturday, December 26th, 1936

I. general medicine

A course in diagnosis and therapy. Drs. B. S. Oppenheimer, Eli Moschcowitz, R. Ottenberg, D. Beck and Staff of Second Medical Service.

Diseases of metabolism. Drs. G. Baehr, H. Lande, H. Pollock and Miss Wood and Dietetic Staff.

Diseases of the kidneys and arteries. Dr. Eli Moschcowitz.

Diseases of the liver and biliary passages. Drs. R. Colp, P. Klemperer, S. S. Lichtman and R. Ottenberg.

General bedside therapy. Dr. D. Poll.

Clinical manifestations of coronary artery disease. Drs. E. P. Boas and H. Levy.

Practical pharmacology. Dr. H. T. Hyman.

* For further information concerning the courses, please apply to Miss Edith L. Levy, Secretary for Medical Instruction.

Practical hematology. Dr. N. Rosenthal.
Clinical electrocardiography. Drs. A. M. Master, H. L. Jaffe and S. Dack.
Gross and microscopic cardiopathology. Dr. L. Gross.
Roentgenology of the cardiovascular system. Dr. M. L. Sussman.
Cardiac arrhythmias. Dr. I. R. Roth.
Allergy: its relation to internal medicine. Dr. J. Harkavy.
Diseases of the chest. Dr. C. B. Rabin.
Peripheral vascular disorders: medical and surgical aspects. Drs. S. Silbert and S. H. Averbuck.
General and special pathology. Drs. P. Klemperer and S. Otani.
Surgical pathology. Drs. P. Klemperer and S. Otani.
Clinical bacteriology and immunology. Dr. G. Shwartzman.
Practical course in clinical bacteriology. Miss Cecele Herschberger.

Advanced course in cardiology

Four weeks' intensive course. Instructors will be announced later.

II. ENDOCRINOLOGY

Clinical Endocrinology. Drs. R. T. Frank, B. S. Oppenheimer, S. Silver and B. Eliasoph.

III. GASTROENTEROLOGY

Four weeks' intensive course. Instructors: Drs. G. Baehr, R. Colp, B. B. Crohn, S. J. Goldfarb, E. Granet, P. Klemperer, B. A. Kornblith, R. Lewisohn, B. S. Oppenheimer, R. Ottenberg and A. Winkelstein.
Diagnosis and treatment of diseases affecting the gastro-intestinal tract. Drs. B. B. Crohn, A. Winkelstein, E. Granet and B. A. Kornblith.

IV. PROCTOLOGY

Intensive course in office proctology. Drs. S. D. Manheim, A. Goldschmidt and L. J. Druckerman.

V. DISEASES OF CHILDREN

Clinical pediatrics: A comprehensive course for the general practitioner, including infant feeding in health and nutritional disease; laboratory and clinical methods of diagnosis; diseases of older children; with opportunity for bedside study and discussion. Instructors: Drs. B. Schick, H. Schwarz, M. H. Bass, B. S. Denzer, J. L. Kohn, S. Karelitz, A. E. Fischer and G. J. Ginandes.
Clinical aspects of cardiac defects in children up to the age of sixteen. Dr. I. R. Roth.
Conduct disorders of children. Dr. I. S. Wile.
Asthma in children. Dr. M. M. Peshkin.
Diabetes mellitus in children. Dr. A. E. Fischer.

VI. NEUROLOGY AND PSYCHIATRY

Applied neuroanatomy and neuropathology. Dr. J. H. Globus.
Psychoanalysis in medicine. Drs. C. P. Oberndorf and A. Slutsky.
Clinical work in mental diseases. Drs. C. P. Oberndorf and S. Lorand.

VII. GYNECOLOGY

Gynecological diagnosis, treatment and pathology. Dr. R. T. Frank and Staff.
Radiotherapy in gynecology. Dr. W. Harris.
Psychological aspects of gynecology. Dr. M. D. Mayer.

VIII. OPHTHALMOLOGY

Ophthalmoscopy. Dr. K. Schlivek.
Ophthalmic surgery. Dr. I. Goldstein.
Ophthalmic neurology. Dr. R. K. Lambert.
Clinical ophthalmology. Dr. H. Minsky.
Ophthalmology. (a) Refraction; (b) Muscles. Dr. J. Levine.
Pathology of the eye in general disease. Dr. D. Wexler.
Eye embryology. Dr. A. L. Kornzweig.

IX. DERMATOLOGY

Dermatology and syphilis. Drs. I. Rosen, L. Chargin, S. M. Peck and Staff
Clinical dermatology. Drs. I. Rosen, O. L. Levin and M. Scheer.

X. OTOLOGY

Otologic anatomy, histology and pathology. Dr. J. G. Druss.

XI. RADIOGRAPHY

X-ray diagnosis of the chest. Dr. A. J. Bendick.
Radiography of gastro-intestinal tract. Dr. S. J. Goldfarb.
Roentgen diagnosis of bone disease. Dr. M. L. Sussman.
General roentgen interpretation. Dr. M. L. Sussman.

XII. PHYSICAL THERAPY

Physical therapy for the general practitioner. Dr. W. Bierman.

XIII. LABORATORY METHODS

The biochemistry of liver, gall-bladder and pancreas. Dr. H. Sobotka.
Routine chemical methods as used at The Mount Sinai Hospital. Miss M. Reiner.

VOLUME III JULY-AUGUST, 1936 NUMBER 2

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

A NEW DEVICE FOR SECURING AND MAINTAINING COMPRESSION IN FEMORAL NECK FRACTURES[1]

ROBERT K. LIPPMANN, M.D.

[*From the Orthopedic Service*]

The common failure of femoral neck fractures to unite has been attributed in recent years to poor blood supply to the femoral head and consequent death of that part, to incomplete reduction, and to inadequate fixation. The first of these factors, death of the capital fragment through circulatory block, can not be considered an insuperable barrier to healing, though it unquestionably mitigates against rapid callus formation. Instances of union between dead head and viable neck have been frequently observed, and the diagnosis has been confirmed by subsequent disintegration of the capital fragment. The effectiveness of all free bone grafts rests upon the ability of bone-forming tissue to penetrate into and develop upon devitalized neighboring bone. The occurrence of femoral head death, then, only increases the importance of accuracy of reduction and adequacy of fixation in these cases. The second factor, accuracy of reduction, has been greatly expedited by the development of new technique, and the use of lateral X-ray views has removed uncertainty. In my opinion, improvement in the fixation of femoral neck fractures constitutes the next step in reducing the proportion of residual non-union.

There is growing dissatisfaction with the plaster spica as a means of fixation. Evidence is increasing that it fails to immobilize well, that it fails to yield bony union in a large proportion of cases, that it often constitutes a hazard rather than a life saving measure and that, at best, it is a source of great discomfort to the patient. These observations have stimulated interest in alternative procedures, particularly blind internal fixation.

While fixation with screws and nails had been attempted repeatedly since 1884 (Langenbeck, Koenig), decided efforts to replace plaster fixation by internal fixation did not commence until 1931, when Smith-Petersen described the "flanged nail." The fixation properties of this instru-

[1] Presented before the Orthopedic Section of the New York Academy of Medicine, May 15, 1936.

ment were considerably better than those of the simple nail and screw, and although the inventor favored insertion of his instrument by open operation, the device suggested to many the advantage of its insertion by the less severe "blind" method. Johansson, Westcott, King, Wilson, O'Meara and others have interested themselves in "blind" nailing with this instrument and have contributed much to the development of its technique. Along the same lines, Moore, Telson and Ransohoff, and Gaenslen have developed the blind insertion of wires for fixation. The mechanical limitations of both these devices render it impossible to secure and maintain by their use firm compression of the fracture surfaces against each other.

Evidence of the importance of compression in hip fractures is not lacking. Those fractured hips, which at one time were treated by various traction methods, developed rapid absorption of the femoral neck and eventual non-union, although the X-ray examinations gave evidence of complete reduction. In contrast to these cases are those of Pauwels-Aachen which, in spite of long standing non-union, healed with amazing rapidity when, by means of osteotomy, the fracture line was converted from a vertical to a horizontal plane, and the compression force of muscle pull and weight-bearing so utilized. From this evidence, it is reasonable to suppose that efficient application of compression to the fixation of fresh fractures of the femoral neck should increase the proportion of cases to heal by bony union.

Wires and nails can be driven home after a hip fracture is impacted, but they can not maintain the compression so secured any longer than the duration of strong friction between their smooth surfaces and the bone. Experience has shown the duration of this friction to be often inadequate. An instrument utilizing the metal screw has been designed to secure compression-fixation (Jones), but both wood and metal screws have repeatedly demonstrated their inability to maintain a hold on the trabecular bone of the femoral head for sufficient length of time to permit healing.

Two years of experimentation resulted in the development of a device which secures and maintains solid impaction for the duration of the healing period. This purpose is accomplished by the incorporation of a principle which I believe is new to bone surgery, that of the corkscrew. The head of this device is a modified corkscrew (Figs. 1*B*, 1*C*). This part is designed to rest entirely within the capital fragment and, when in this position, presents a broad metallic surface almost at right angles to its axis. This surface supplies an effective anchorage for strong traction on the femoral head. The corkscrew head has the additional advantages of penetrating easily through the spongy trabecular bone without hammering or previous drilling and of destroying a minimum of bone in this process.

Counter pressure forcing the trochanteric fragment toward the fixed

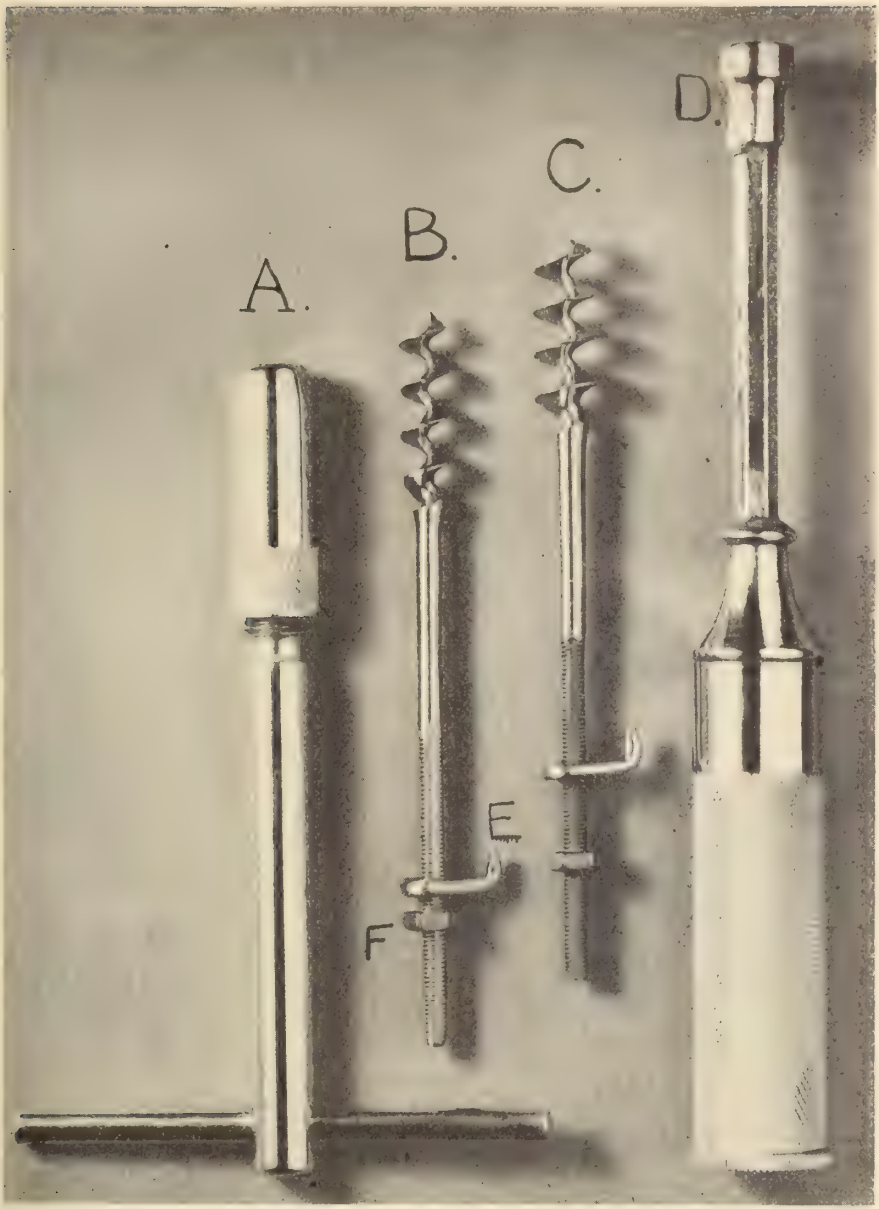


FIG. 1. Armamentarium. (*A*) Hand wrench. (*B*) Three-eighths inch diameter corkscrew pin. (*C*) One-half inch diameter corkscrew pin. (*D*) Top-wrench for turning nut.

central one is accomplished by a trochanter catch (Fig. 1*E*) pressed into position by a threaded nut (Fig. 1*F*). The catch is also essential to pre-

vent rotation of the entire instrument and consequent relaxation of tension after insertion. A spike at one end of the catch sinks into the trochanter and prevents rotation with reference to the bone. The catch can not rotate upon the shaft because the fitting is square and permits only sliding motion. In this manner, the catch prevents any portion of the instrument from rotating after it is applied. In squaring the shaft, enough of the circular contour remains at the corners for threading and this thread receives the nut that presses the catch into position.

The instrument is made of high carbon steel and is untempered. The untempered steel has ample strength and will bend rather than crack in the event of a flaw in the metal. Three-eighths and one-half inch diameter corkscrews are used, the larger size when the bone is osteoporotic and a firmer grasp of the femoral head appears necessary. A hand wrench (Fig. 1*A*) is used to insert the instrument, and the nut which is later applied is tightened with the top wrench (Fig. 1*D*). It will be noted that the hand wrench has a long shank and long chuck, the latter to facilitate loosening outside the small incision after the pin is fully inserted. An end cutting pliers to remove excess shaft after insertion and a curved pliers to grasp the trochanter catch for its removal complete the armamentarium.

Operative Technique. Insertion of the instrument is accomplished under fluoroscopic and X-ray control with the patient under avertin anesthesia. A one and one-half inch lateral subtrochanteric incision is employed. The need for prior X-ray protractor measurements and calculation of the length of the neck are unnecessary when this device is used. When the primary reduction is checked by fluoroscope, the projection of the head on the anterior surface of the patient is marked with a silver nitrate applicator. The silver can be visualized under the fluoroscope as well as on the skin after the latter is painted with iodine. It is only necessary to aim the pin towards this spot to direct it accurately at the head. When the leg is held in full internal rotation and the pin inserted parallel to the table, there is little danger of it diverging from its course in the antero-posterior plane. The point of insertion into the bone (1 cm. below the vastus externus ridge) is easily identified without the use of X-rays. The depth of insertion may be controlled by check X-rays, but I have found it most convenient to insert the instrument until the acetabulum is penetrated and rotation of the leg is blocked and then to withdraw it until rotation is again free.

In contra-distinction to the Smith-Petersen nail, effort is made to insert this instrument high at the junction between the shaft and trochanter and high in the femoral head. This is done for several reasons. Primarily, if tension relaxes somewhat, compression is retained at the lower aspect of the fracture. If the pin is inserted low in the head and laxity develops, the upper aspect of the fracture will tend to separate from the force of upward muscle pull on the trochanter and shaft (Fig. 2). Secondly, the high position precludes late rotary displacement of the head from upward pull on the distal fragment. Finally, by encroaching upon stronger and rela-

tively avascular bone, the pin maintains a stronger hold on the head and interferes less with the vascular supply at the fracture area.

When the pin is screwed into satisfactory position, the catch is slipped on to the shaft and is tightened against the trochanter by turning the nut with the top wrench. As the nut tightens, the fracture surfaces are pressed

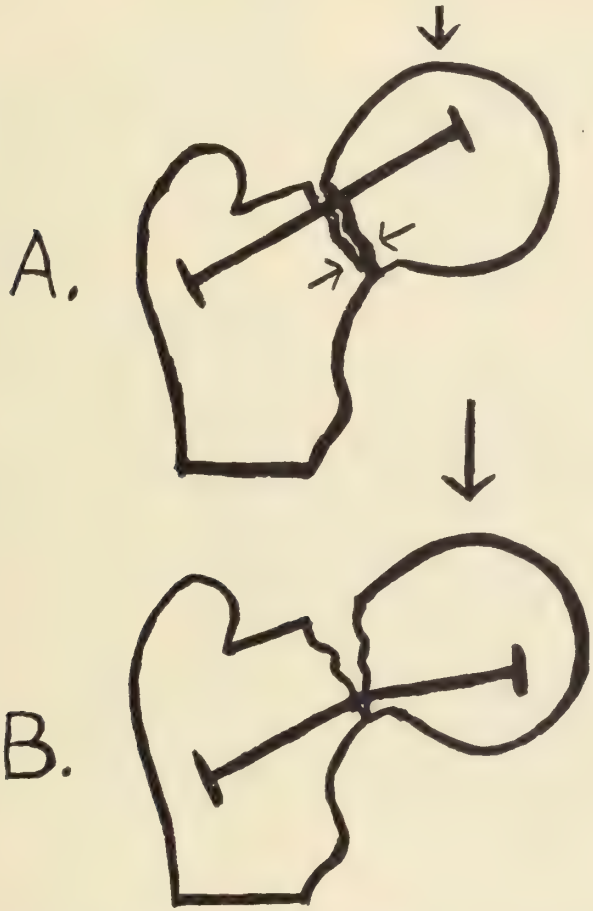


FIG. 2. (*A*) Sketch showing maintenance of compression if the pin is placed high and a moderate degree of laxity occurs. (*B*) Loss of compression with a similar degree of laxity if the pin is placed low.

together and impaction is secured. Excess shaft is then removed with the clipper and the wound closed.

CASE REPORT

The patient (Adm. 377215), 46 years of age, entered the hospital March 2, 1935, immediately following an automobile accident. He complained

of pain in the left hip. Roentgenograms revealed an intracapsular fracture of the left hip. On the following day with the patient under avertin

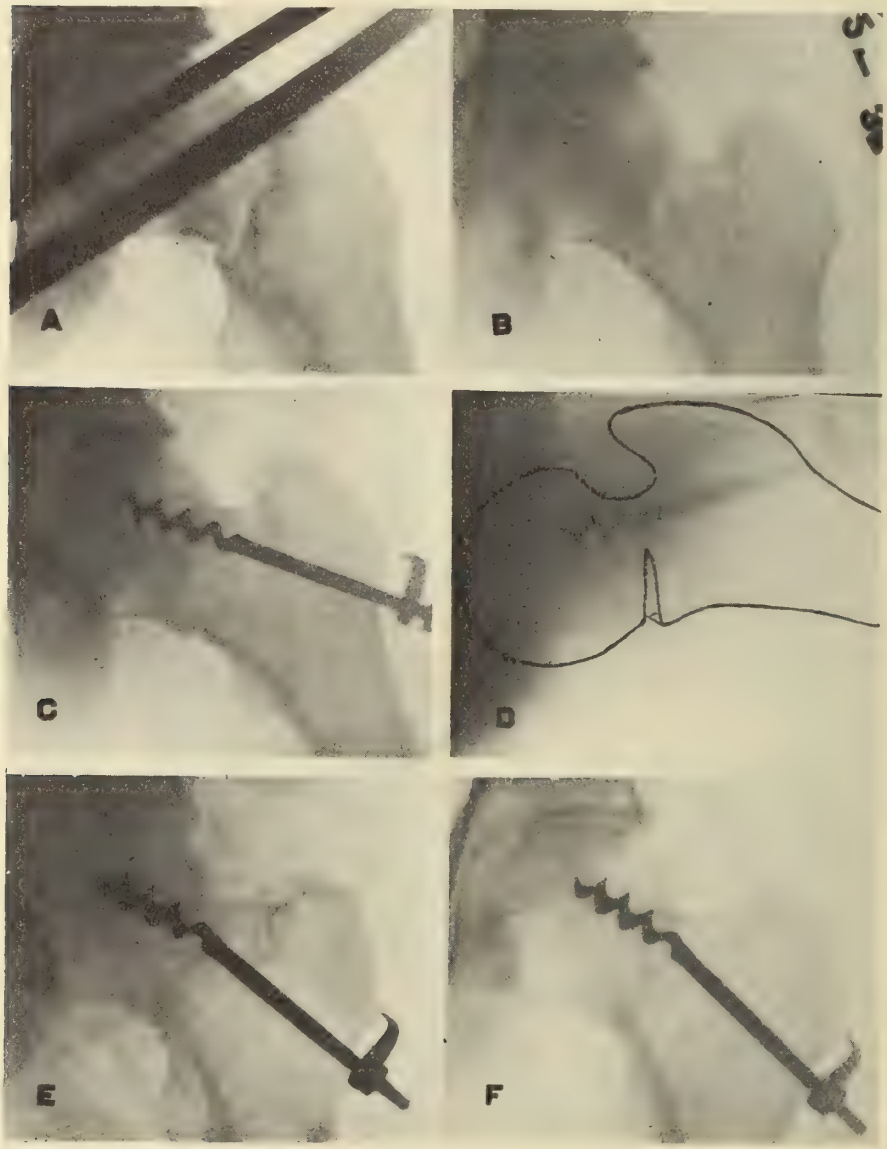


FIG. 3. (*A*) Original fracture. (*B*) Reduction. (*C*) Pin in process of insertion. (*D*) Lateral view of same. (*E*) Three months later. (*F*) Eight months later.

anesthesia on the fluoroscopic table, the fracture was reduced by the Leadbetter technique, X-rays confirming complete reduction. A two-inch

lateral subtrochanteric incision was then made and, under fluoroscopic control, the above described instrument was inserted. The wound was closed in layers and subsequent X-rays showed that complete reduction had been maintained and that compression of about one-quarter of an inch had been obtained (Fig. 3). The operation including time out for developing X-rays occupied less than an hour. Convalescence was uneventful except for a slight serous discharge which persisted for about

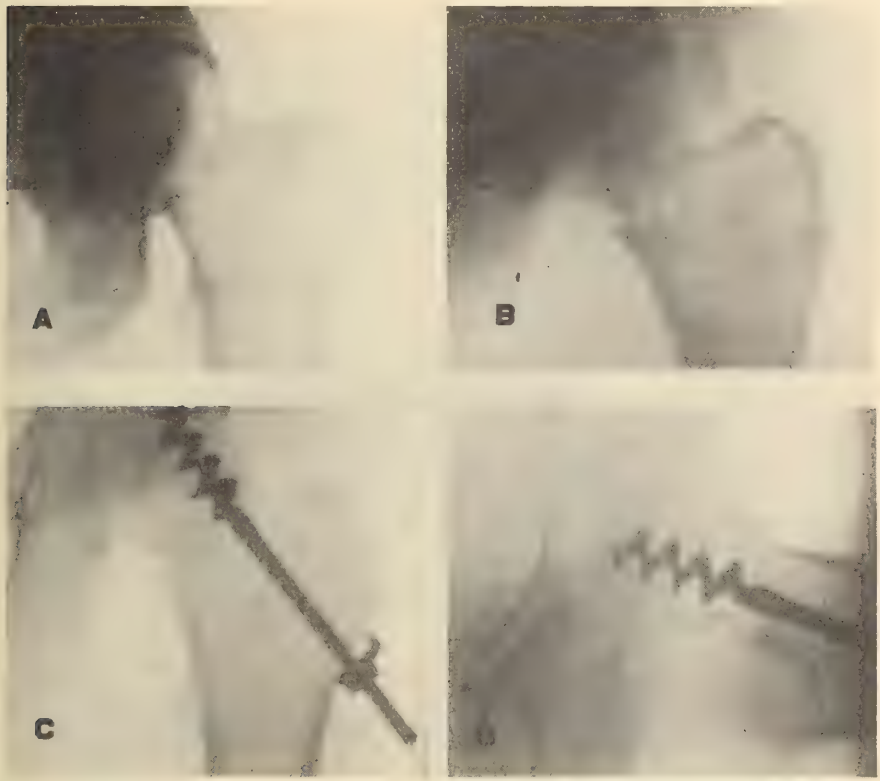


FIG. 4. (*A*) Fracture on admission. (*B*) Reduction. (*C*) Screw maintaining compression. (*D*) Lateral view.

five days. Two and one-half weeks after operation an X-ray disclosed that the device had bent slightly at the junction of the corkscrew and the shaft (due to a defect in the instrument which has since been remedied). For this reason a short spica plaster was applied to give security. Three months after operation, X-ray examination disclosed firm healing and the plaster spica was removed.

It is now ten months since operation. X-rays no longer show the fracture line. Motion is approximately three-quarters normal; the Trendelen-

burg sign is negative and there is no limp. The patient still has occasional pain where the pin abuts against soft tissue but insufficient to warrant removal of the screw.

COMMENT

The instrument has been employed in several other cases of intracapsular hip fracture. Thus far, the device gives every indication of fulfilling its purpose.

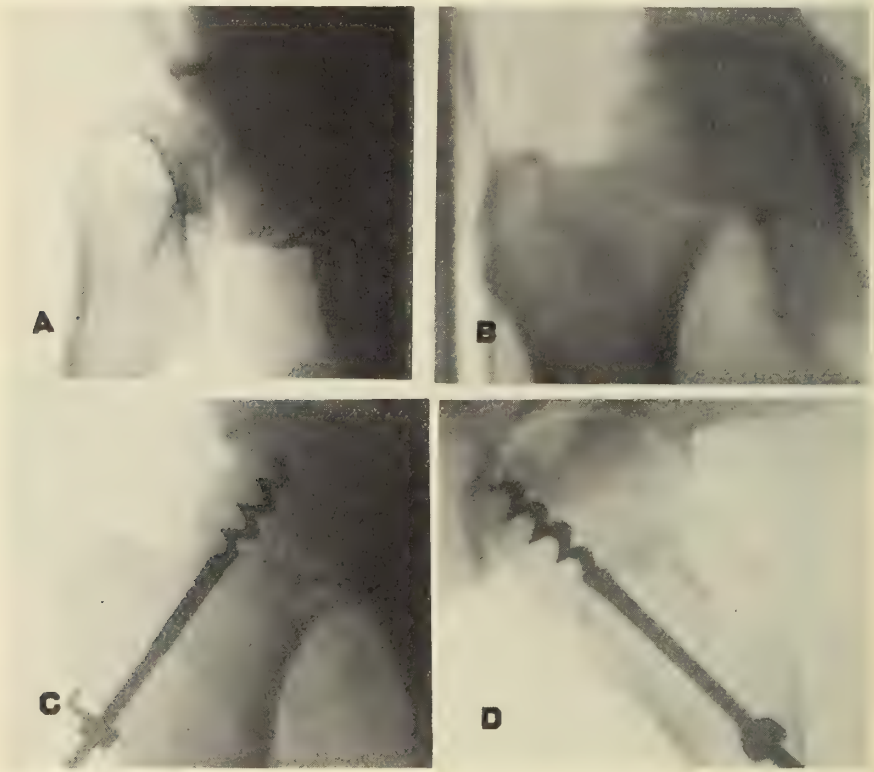


FIG. 5. (*A*) Fracture on admission. (*B*) Reduction. (*C*) Screw maintaining compression. (*D*) Lateral view.

The roentgenograms of two additional satisfactory applications of the instrument (Figs. 4, 5) illustrate well the obliteration of the space between the fracture surfaces as a result of the compression force of the screw (Figs. 4*B*, 4*C*, 5*B*, 5*C*).

A complete report of the end results is deferred until additional conclusive data have accumulated. At the present time the advantages of the instrument appear to be as follows:

(1) A firm anchorage in the capital fragment is secured permitting compression and impaction of the fracture. The broad surface area of the corkscrew portion insures the postoperative maintenance of anchorage in the capital fragment.

(2) There is ease of insertion and adjustment with particular regard to depth.

(3) Telescoping of the delicate trabeculae of the femoral head, a common occurrence when broad nails are hammered into it, results in apposition of only the periphery of the fracture surface. Such telescoping does not occur with this instrument; consequently contact of the entire fracture surface, not only of the periphery, is obtained. Theoretically, this should improve the opportunity for bony healing.

(4) Pressure of over three hundred pounds, applied in diverse directions on a fresh adult cadaver specimen, failed to disturb the fixation.

The author desires to gratefully acknowledge the helpful review of this work by Dr. Philip D. Wilson.

REFERENCES

Gaenslen, F. J.: Subcutaneous Spike Fixation of Fresh Fractures of the Head of the Femur. J. Bone & Joint Surg. 17: 379, 1935.

Johansson, S.: Zur Technik der Osteosynthese der Fractur Colli Femoris. Zentralbl. f. Chir. 59: 2019, 1932; 60: 864, 1933.

Jones, L.: Intracapsular Fractures of the Neck of the Femur; Closed Double Screw Method for Reduction Fixation; a Preliminary Report. Ann Surg. 97; 237, 1933.

King, T.: Recent Intracapsular Fractures of the Neck of the Femur. A Critical Consideration of their Treatment and a Description of a New Technique. Med. J. Australia, 1: 5, 1934.

Langenbeck and Koenig: Verhandl. d. deutsch. Gesellsch. f. Chir. Siebenter Kongress. 1: 92, 1878.

Moore, A. T.: Fracture of the Hip Joint. A New Method of Skeletal Fixation. J. S. Carolina M.A. 30: 199, 1934.

O'Meara, J. W.: Fractures of the Femoral Neck Treated by Blind Nailing. J. Bone & Joint Surg. 17: 928, 1935.

Pauwels-Aachen: Grundlagen des Heilungvorganges bei Schenkelhalsbruchen. Verhandl. d. deutsch. orthopaedischen Gesellsch. Kong. 29: 54, 1934.

Smith-Petersen, M. N., Cave, E. F., and Vangorder, G. W.: Intracapsular Fractures of the Neck of the Femur. Treatment by Internal Fixation. Arch. Surg. 23: 715, 1931.

Telson, D. R., and Ransohoff, N. S.: Treatment of Fractured Neck of Femur by Axial Fixation with Steel Wires. J. Bone & Joint Surg. 17: 727, 1935.

Westcott, H. H.: A Method for the Internal Fixation of Transcervical Fractures of the Femur. J. Bone & Joint Surg. 16: 372, 1934.

Wilson, P. D.: Personal Communication.

THE EFFECT OF LOWERED BASAL METABOLISM INDUCED BY AN 800 CALORIE DIET ON THE VOLUME OUTPUT AND WORK OF THE HEART IN A CASE OF CORONARY THROMBOSIS[1]

SIMON DACK, M.D.

[*From the Cardiographic Laboratory and the Medical Service of Dr. B. S. Oppenheimer*]

In recent reports (1) on the value of an 800 calorie diet in the treatment of coronary thrombosis, it has been shown that the basal metabolic rate dropped 20 to 30 per cent as a result of the undernutrition. Benedict (2) and Lusk (3) had previously obtained similar results following diminished caloric intake in normal adults. Not only did the basal metabolic rate drop but the pulse rate decreased and the blood pressure and pulse pressure fell. They reasoned that the work of the heart was thereby definitely reduced. Recently Blumgart (4) and his associates advocated total thyroidectomy for chronic heart disease, maintaining that the lowered metabolic rate reduced the demands upon the heart and circulation. In a study of hypothyroidism following total thyroidectomy, Altschule and Volk (5) found a marked diminution in the minute volume output and in the work of the heart.

It was believed that the good results obtained with undernutrition in our patients with coronary thrombosis could also be explained on the basis of lowered basal metabolism and reduced cardiac output. Obviously in patients who have recently suffered an acute coronary thrombosis, one must select for the determination of the cardiac output a subject in whom the pulse rate, blood pressure and other circulatory factors have become stabilized. The following patient was considered a suitable subject for such a determination for he offered an excellent opportunity to compare the cardiac output and related circulatory factors at a low level of metabolism and after return to a normal basal metabolic rate.

History. The patient (Adm. 384091) was a man, forty years of age, who suffered his second attack of coronary occlusion seven hours prior to admission to the hospital. He had been aware of a moderate hypertension since his first attack two years previously. Severe precordial pain persisted for about one day and then subsided gradually. The initial blood pressure of 170 mm. systolic and 100 mm. diastolic dropped on the fourth day to 116 mm. systolic and 82 mm. diastolic. There was no evidence of cardiac failure; the venous pressure measured 4.5 cm. of blood, the arm-to-tongue circulation time as determined with saccharin (6) measured four-

[1] Presented at the Clinical Conference, January 24, 1936.

teen seconds, and the vital capacity of the lungs 3900 cc. The electrocardiogram revealed progressive changes typical of infarction of the anterior surface of the left ventricle (coveplane T-1, absent Q-4 and high upright T-4).

Course. The treatment consisted of absolute bed rest and an 800 caloric diet. The patient did extremely well on this régime. Precordial pain disappeared entirely after the second day. The basal metabolic rate dropped from - 9 per cent in the first week to —21 per cent on the eighteenth day, and to —40 per cent at the end of the third week. There was a concomitant loss of weight from 150 pounds to 132 pounds. The pulse rate decreased from 75 to 90 beats per minute in the first week to 50 to 60 beats in the third week. The systolic blood pressure fell to 100 to 110 mm. and the diastolic pressure to 70 to 74 mm. The circulation time increased to 19 to 21 seconds despite the absence of clinical signs of heart failure and the vital capacity ranged between 4000 and 4300 cc. The low calorie diet was continued for seven weeks, during which time the basal metabolic rate was maintained between —30 and —40 per cent and the weight dropped to 129 pounds. At the end of the seventh week, the patient was symptom-free and out of bed. The circulatory measurements had remained at constant levels for several weeks. The pulse rate still averaged 50 to 60 beats per minute, the systolic pressure 100 mm., the diastolic pressure 70 mm., the circulation time fifteen seconds and the vital capacity 4000 cc. Determinations of the cardiac output were carried out at this time and are described below. Then, in order to compare the values obtained at the low level of metabolism with those at a normal level, the diet was increased to 2000 to 2500 calories per day. The basal metabolic rate rose gradually to —16 per cent in five weeks and to —5 per cent at the end of the sixth week, and the weight increased to 145 pounds. The cardiac output studies were repeated two months after resumption of a full diet. The results are tabulated in the accompanying table.

Observations on Cardiac Output. The cardiac output was measured by the acetylene method as modified recently by Gladstone (7). Five determinations were made before and four after resumption of a full diet. Simultaneous measurements of pulse rate, blood pressure, blood velocity, vital capacity and blood cholesterol were made under basal conditions.

On the 800 calorie diet, with a basal metabolic rate of - 29 per cent, the minute volume output averaged 2.76 liters. On a full diet, the basal metabolic rate rose to -5 per cent and the minute volume output increased to an average of 4.15 liters. Considering the latter value as the normal for the patient, it is apparent that there was a decrease of 33.5 per cent in cardiac output when the basal metabolic rate was lowered by the 800 calorie diet. Similarly, the cardiac index (cardiac output per square meter of body surface (8)) increased from an average of 1.67 to 2.37. The

arteriovenous oxygen difference which averaged 57.4 cc. per minute on the low diet decreased slightly to 53.1 cc. on the full diet. A similar but more marked change was observed by Altschule and Volk (5) following total thyroidectomy.

Observations on the Work of the Heart. The related circulatory measurements showed changes indicating a distinct effect on the work of the heart after return of the basal metabolic rate to a normal level. The pulse rate increased from an average of 58 to 71 beats per minute. The systolic blood pressure rose from 96 to 126 mm. and the diastolic pressure from 65 to 85 mm. There was thus an increase in pulse pressure from 31 to 41 mm. These findings are similar to those reported by Benedict (2) and

Effect of Low Calorie Diet on Basal Metabolism and Work of the Heart

DIET	DAY	WEIGHT	B.M.R.	OXYGEN CONSUMPTION	A-V DIFFERENCE	CARDIAC OUTPUT	CARDIAC INDEX	PULSE RATE	SYSTOLIC BLOOD PRESSURE	DIASTOLIC BLOOD PRESSURE	PULSE PRESSURE	MEAN PRESSURE	SYSTOLIC OUTPUT	CARDIAC WORK	CIRCULATION TIME	VITAL CAPACITY
calories		*lbs.*	*per cent*	*cc. per minute*	*cc. per liter*	*liters per minute*			*mm.*	*mm.*	*mm.*	*mm.*	*cc.*	*kg. meters per minute*	*seconds*	*liters*
800	46	130	−28	159	58 0	2.74	1.66	62	92	66	26	79	44.2	3 04	15	4.1
	48	130	−29	157	63.5	2.47	1 49	54	96	64	32	80	45.7	2.69		
			−30	153	61.4	2.49	1.51	54	96	64	32	80	46.1	2 71		
	49	130	−30	155	52.6	2.94	1.78	60	92	62	30	77	49 0	3.08		
			−27	162	51.0	3.18	1 93	60	106	72	34	89	53.0	3.85		
Average		130	−29	157	57 4	2.76	1 67	58	96	65	31	81	47.4	3.05	15	4.1
2500	57	145	−5	219	53 4	4.09	2 34	72	128	86	42	107	56.8	5 95	15	4.1
			−6	218	51.6	4 22	2 41	68	130	84	46	107	62.0	6.14		
	58	145	−3	224	49 8	4 49	2 56	75	120	84	36	102	59 6	6.23		
			−5	220	57.7	3 81	2.18	70	126	86	40	106	54 4	5.49		
Average		145	−5	220	53.1	4 15	2 37	71	126	85	41	106	58 0	5 95	15	4.1
% change		−10.7	−24.0	−28.7	+8.0	−33.5	−29.5	−18.3	−23.8	−23.5	−24 4	−23.6	−18.7	−48.7	0	0

his co-workers in their study of undernutrition in normal individuals. It is apparent from these effects on pulse rate and blood pressure that not only was there a distinct decrease in cardiac output on the low calorie diet but also a more marked reduction in the work of the heart. The usual formula employed to measure the latter is $W = V \times P + \frac{wv^2}{2g}$ (9) where V denotes volume output and P mean arterial pressure; the velocity fraction $\left(\frac{wv^2}{2g}\right)$ can be disregarded in this instance, for under ordinary circumstances, it represents only a small fraction of the total work (1 to 3 per cent). When the basal metabolic rate was lowered to −29 per cent on the low

caloric diet, the work of the left ventricle as calculated by this formula measured 304 gram-meters per minute. With resumption of a full diet and rise of the metabolic rate to −5 per cent, the work of the left ventricle almost doubled, now measuring 596 gram-meters. Thus, the low caloric diet induced a drop in metabolism of 25 to 35 per cent, a decrease in cardiac output of 33.5 per cent and reduction in the work of the heart of 49 per cent.

The vital capacity of the lungs was unaffected by the changes in caloric intake and metabolic rate, measuring 4000 cc. both before and after resumption of a full diet. The blood velocity was also unaffected by the change in metabolic rate. The arm-to-tongue circulation time measured 15 seconds at both the low and normal levels of metabolism. Similar normal values for blood velocity have been obtained in other patients of our series whose basal metabolic rate was lowered by the 800 calorie diet (1).

Comparison of the Effects of Lowered Basal Metabolism Induced by Undernutrition with Those Found in Myxedema. Because of the close relationship between basal metabolic rate and blood cholesterol in myxedema (10), frequent determinations of the latter were made in our patient. At the onset of his illness, the blood cholesterol was 335 mg. per 100 cc. of blood. When the basal metabolic rate dropped, the cholesterol ranged between 290 and 385 mg. Two months after resumption of a full diet with consequent rise of the basal metabolic rate to normal, the blood cholesterol was 345 mg. There was thus very little change in blood cholesterol with changes in caloric intake and basal metabolic rate. The lowered metabolism following undernutrition differs in this respect from myxedema in which there is a rise in blood cholesterol with a fall in basal metabolic rate. Furthermore, our patient at no time evinced any clinical signs of myxedema, such as dry skin and sluggish mentality. Nor was there a decrease in blood velocity, another finding characteristic of myxedema (11), despite the marked fall in basal metabolism and decrease in cardiac output. It is thus evident that with the use of a low calorie diet, there can be obtained a fall in basal metabolism and reduction in cardiac output and work of the heart without slowing of the blood velocity and without the disagreeable symptoms of myxedema such as occur following total thyroidectomy.

Summary. In a patient who had recently suffered an acute coronary artery occlusion, an 800 calorie diet lowered the basal metabolic rate to 30 to −40 per cent. The lowered metabolism was accompanied by slowing of the pulse rate, lowering of the blood pressure and pulse pressure, and reduction of 33.5 per cent in cardiac output. The work of the heart was reduced by 49 per cent. The vital capacity, blood velocity and blood cholesterol were unaffected by the low calorie diet and lowered basal metabolism. The marked clinical improvement observed in this patient is attributed to these beneficial effects of the low calorie diet on the heart and circulation.

BIBLIOGRAPHY

(1) Master, A. M., Jaffe, H. L., and Dack, S.: Low Basal Metabolic Rates Obtained by Low Caloric Diet in Coronary Artery Disease. Proc. Soc. Exper. Biol. & Med. 32: 779, 1935.

Master, A. M., Jaffe, H. L., and Dack, S.: The Basal Metabolic Rate in a Patient with Coronary Artery Thrombosis when Placed on an 800 Calorie Diet. J. Mt. Sinai Hosp. 1: 263, 1935.

Master, A. M., Jaffe, H. L., and Dack, S.: Undernutrition in the Treatment of Coronary Artery Disease (particularly Thrombosis). Effect on Basal Metabolism and Circulation. In Press.

(2) Benedict, F. G., Niles, W. R., Roth P., and Smith, H. M.: Human Vitality and Efficiency under Prolonged Restricted Diet. Carnegie Institute of Washington, Publication 280, 1919.

(3) Lusk, G.: The Physiological Effect of Undernutrition. Physiol. Rev. 1: 523, 1921.

(4) Blumgart, H. L., Riseman, J. E. F., Davis D., and Berlin, D. D.: Therapeutic Effect of Total Ablation of Normal Thyroid in Congestive Heart Failure and Angina Pectoris; III. Early Results in Various Types of Cardiovascular Disease and Coincident Pathologic States without Clinical or Pathological Evidence of Thyroid Toxicity. Arch. Int. Med. 52: 165, 1933.

(5) Altschule, M. D., and Volk, C.: The Minute Volume Output and the Work of the Heart in Hypothyroidism. J. Clin. Invest. 14: 373, 1935.

(6) Fishberg, A. M., Hitzig, W. M., and King, F. H.: Measurement of the Circulation Time with Saccharin. Proc. Soc. Exp. Biol. & Med. 30: 651, 1933.

(7) Gladstone, S. A.: A Modified Foreign-Gas Method for Determination of Cardiac Output in Man. Proc. Soc. Exp. Biol. & Med. 32: 1321, 1935.

(8) Grollman, A.: The Cardiac Output of Man in Health and Disease. Springfield, Ill., Charles C. Thomas, 1932, p. 86.

(9) Evans, C. L., and Matsuoka, Y.: The Effect of Various Mechanical Conditions on the Gaseous Metabolism and Efficiency of the Mammalian Heart. J. Physiol. 49: 379, 1914–1915.

Wiggers, C. J.: Circulation in Health and Disease, Ed. 2, Philadelphia, Lea & Febiger, 1923, p. 136.

(10) Hurxthal, L. M.: Blood Cholesterol and Thyroid Disease. Myxedema and Hypercholesteremia. Arch. Int. Med. 53: 762, 1934.

Gilligan, D. R., Volk, M. C., Davis, D., and Blumgart, H. L.: Therapeutic Effect of Total Ablation of Normal Thyroid in Congestive Heart Failure and Angina Pectoris: VIII. Relationship between Serum Cholesterol Values, Basal Metabolic Rate and Clinical Aspects of Hyperthyroidism. Arch. Int. Med, 54: 746, 1934.

(11) Blumgart, H. L., Gargill, S. L., and Gilligan, D. R.: Studies on the Velocity of Blood Flow. XIV. The Circulation in Myxedema with a Comparison of Blood Flow in Myxedema and Thyrotoxicosis. J. Clin. Invest. 9: 91, 1930.

ADENOMA OF THE BRONCHUS

FREDERICK H. KING, M.D., AND MAX L. SOM, M.D.

[*From the Medical Service of Dr. B. S. Oppenheimer and the Laryngological Service of Dr. Rudolph Kramer*]

During the past five years keen interest in the diagnosis and treatment of benign bronchial tumors, engendered by the studies of Wessler and Rabin (1) and Kramer (2), has resulted at this hospital in frequent detection of this lesion and a high percentage of good therapeutic results. This pulmonary lesion merits the strict attention of clinicians for, though it concerns a benign tumor, the effects on the lung of its continued presence are irreparable and the outcome is almost invariably fatal. On the other hand, correct diagnosis and surgical intervention may achieve excellent results since the tumor is removable.

CASE REPORT

History (Adm. 379095). The patient was a young man of thirty who was admitted to the hospital on April 24, 1935. Five years prior to admission, without antecedent or concomitant sinus disease and without a history of symptoms or an illness involving the lungs, he developed a cough which became progressively worse. Whereas early in his illness the cough had been dry, irritating and non-productive, it later was accompanied by moderately profuse expectoration of thick, yellowish, occasionally blood-tinged sputum amounting to about three ounces daily. He stated that at irregular intervals during this period he suffered from many "chest colds" characterized by fever and increased cough and expectoration, the latter being only occasionally blood-tinged.

Notwithstanding these complaints, the patient continued at his occupation as a clerk until six months before admission to the hospital, when on the advice of physicians he entered a tuberculosis sanatorium. He left the institution after only a short stay, as he believed that he was not improving. Urged by other physicians, he entered another sanatorium. Here an iodized oil study was made revealing bronchiectasis in the right lower lobe. Phrenicectomy was advised, but the patient demurred and returned to the city. Repeated examinations of the sputum failed to reveal tubercle bacilli. At this time the patient came under the observation of one of us, on whose advice he entered the hospital.

Examination. The patient was of pallid complexion and coughed at frequent intervals, expectorating yellowish mucopurulent sputum. He

was afebrile. The trachea was found to be freely movable and in the midline. Over the right base posteriorly and in the axilla there were dulness and markedly diminished breath sounds. Moist râles were audible over this area. The only other significant physical finding was moderate clubbing of the fingers. Tubercle bacilli could not be demonstrated on repeated examinations of his sputum. A roentgenogram of the chest showed a clearly demarcated, wedge-shaped shadow in the paravertebral segment of the right lower lobe which was interpreted as a segmental area of atelectasis probably due to an obstructive lesion in the corresponding bronchus. The heart was shifted slightly to the same side (Figs. 1 and 2).

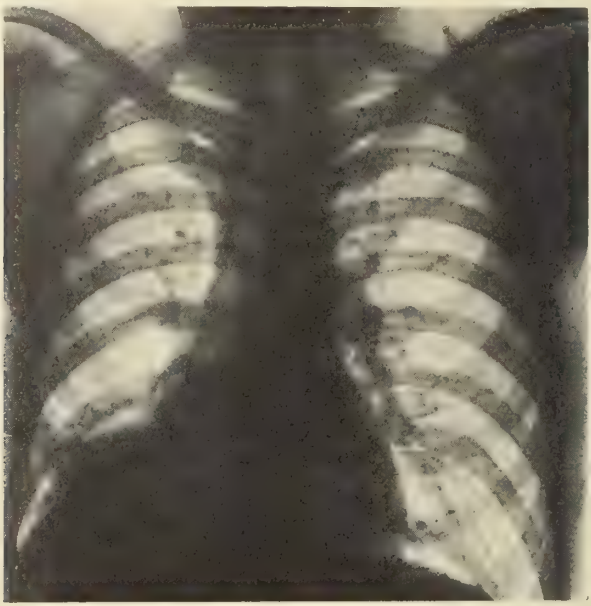


Fig. 1. X-ray of chest antero-posterior view. Shadow of atelectatic segment is behind right portion of the heart. Mottled shadow at right base is previously injected lipiodol. Note deviation of trachea to right side.

Course. At bronchoscopy the bronchus to the right lower lobe was found to be occluded by a pinkish ovoid mass at a point about 1 cm. below the origin of its apical division. This mass was estimated to be about 2 by 1 cm. in size and was found to be attached by a pedicle to the postero-medial wall of the bronchus at a lower level than the presenting bulbous end of the tumor. Recognized at bronchoscopy as a benign tumor, the major portion of it was promptly removed (Fig. 3) and was later reported by Dr. Klemperer as *benign adenoma* (Fig. 4).

The patient was bronchoscoped again three days later and a remaining small part of the tumor was removed, completely reëstablishing the patency



FIG. 2. X-ray of chest, lateral view, showing wedge-shaped shadow in lower right paravertebral region, representing segmental area of atelectasis.

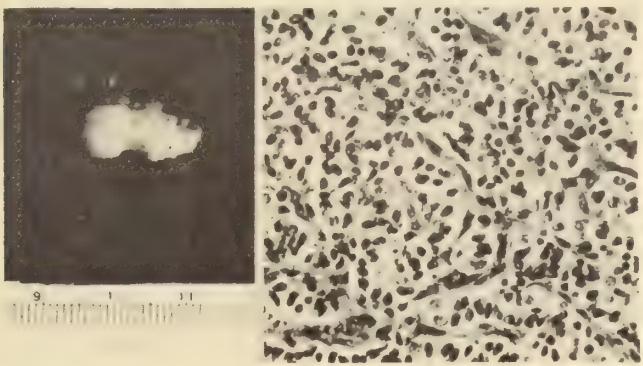


FIG. 3 FIG. 4

FIG. 3. Gross appearance of excised tumor

FIG. 4. Histological structure of tumor

of the bronchial lumen. Subsequent examination of the chest again showed dulness at the right base, but loud bronchial breathing was now present, the latter giving evidence of the functional patency of the bronchus corresponding to the atelectatic pulmonary segment. At this time a film of the chest showed a persistence of the atelectasis of this area. The patient was bronchoscoped on two subsequent occasions at four day intervals at which times biopsies were taken to exclude the presence of any remnant of tumor tissue. At the same time the base of the tumor was coagulated with diathermy.



FIG. 5. X-ray of chest with aid of lipiodol, made six weeks after patient's discharge, showing cylindrical and saccular bronchiectasis at right base. Note absence of wedge-shaped shadow.

On the day following the second bronchoscopy the patient noted marked diminution in cough and expectoration. These symptoms further abated within a few days so that after one week the patient was entirely symptom-free. He was allowed to go home and was advised to return to the Follow-up Clinic. Bronchoscopy three weeks after discharge showed the bronchial lumen to be wide open, and no further coagulation was deemed necessary. An iodized oil study of the bronchial tree made six weeks after discharge revealed a moderate degree of saccular and cylindrical bronchiectasis in the right lower lobe. It was now noted for the first time that the collapsed lung segment had reëxpanded, the wedge-shaped

shadow being no longer visible (Fig. 5). When the patient was seen six months after his discharge from the hospital, he had gained fourteen pounds and was entirely symptom-free.

COMMENT

A question of academic importance is raised in this case by the roentgen finding of segmental pulmonary collapse. Glass (3) has demonstrated by the injection method that the lung is arranged in segments corresponding to the bronchial distribution. An unusual and illuminating illustration of this in vivo is found in the early chest films of this patient. Because of the collateral respiration with adjoining segments, it is usually difficult to obtain such a clearly defined example. In this instance it is likely that transient superimposed infection prevented such gaseous interchange with adjacent, normally aerated segments, and the demarcation was consequently very clear.

A presumptive clinical diagnosis of benign bronchial tumor could be made in this case because of the prolonged history of cough and expectoration without a history of pulmonary or sinus disease preceding the onset of symptoms, the finding of unilateral physical signs, the presence of clubbing, and the roentgen picture of segmental atelectasis. The one frequent symptom which was not prominent was paroxysmal recurrent hemoptysis terminating abruptly.

Confirmation of the presumptive diagnosis depends entirely on bronchoscopy and biopsy examination. How long delayed the final diagnosis can be when bronchoscopy is not performed is well illustrated by the experience in this case.

The pathological picture in this instance is typical of bronchial adenoma, described and clearly differentiated from carcinoma by Rabin (4). The gross appearance, the regularity of cellular structure and the absence of mitoses are amply corroborative of the clinical impression of the benign character of the tumor gained from the prolonged course of the illness uncomplicated by local invasion or metastatic growth.

It remains only to emphasize that in the absence of complications such as pulmonary suppuration and empyema, requiring additional or independent therapy, treatment consists in bronchoscopic removal of the mass. It is most desirable, when possible, to remove it completely, severing it from its attachment to the bronchial wall at the pedicle. Repeated bronchoscopies and biopsies are necessary to be certain that there is no residual tumor tissue. Coagulation of the base with diathermy is important in insuring as far as is possible a permanent eradication of the neoplasm. With the bronchial lumen patent, the atelectatic segment, as in this case, may reëxpand and local bronchiectasis of moderate extent may be rendered symptomless.

REFERENCES

(1) Wessler, H., and Rabin, C. B.: Benign Tumors of Bronchus. Am. J. M. Sc. 183: 164, 1932.

(2) Kramer, R.: Adenoma of Bronchus. Ann. Otol., Rhinol. & Laryngol. 39: 689, 1930.

(3) Glass, A.: Bronchopulmonary Segment with Special Reference to Putrid Lung Abscess; Anatomic and Roentgenographic Aspects. Am. J. Roentgenol. 31: 328, 1934.

(4) Rabin, C. B.: Quoted by Kramer (2).

PREGNANCY AFTER BILATERAL TUBAL LIGATION

Subsequent Hysterotomy and Tubal Excision

MAX D. MAYER, M.D.

[*Gynecological Service of Dr. Robert T. Frank*]

CASE REPORT

History (Adm. 374359). The patient was admitted to the hospital in December 1932. She was 31 years of age, white, gravida 3 and para 2. Her past history was negative except that she was mentally defective. Her husband and their two children were also mental defectives. The children had been institutionalized. Examination revealed a pregnancy of four months' duration. The psychiatrist who was asked to see the patient found her to be suffering from a psychosis superimposed upon the mental deficiency and advised an interruption of the pregnancy. Hysterotomy and ligation of the tubes was then selected as the most suitable procedure, both on account of her age and the duration of the pregnancy.

Abdominal hysterotomy was performed by the resident gynecologist in December 1932. A small loop of each tube was resected. This same operative procedure has been employed in several hundred sterilizations on the gynecological service. The freest portion of the tube was carefully grasped with a small artery clamp, thus angulating it. A fine suture of twisted silk was passed through the mesentery of the tube. It was tied snugly, but not too tightly, around the base of the thus created knuckle. The top half of the loop was then excised, leaving the two tubal ends pointing away from each other. No attempt was made at burying the stumps. The patient's convalescence was uneventful. She was discharged into the custody of a social service agency interested in her case.

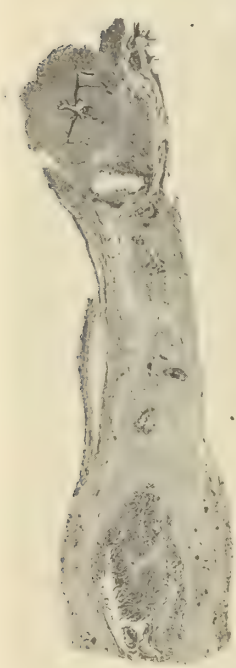
Two years later (December 7, 1934) she was readmitted with a history of amenorrhea dating from September 15. Physical examination revealed her general health to be good, except for a systolic murmur in the mitral region. Blood pressure was normal. Her mental condition was unchanged. The Wassermann test was negative. The gynecological examination revealed a pregnancy of about four month's duration. The uterus seemed somewhat nodular. The adnexa could not be palpated. The psychiatrist believed, as before, that an interruption of the pregnancy was necessary.

In the opinion of Dr. William Harris, a roentgen-ray abortion was out of the question because he considered the pregnancy too far advanced and menopausal symptoms might aggravate the patient's mental condition. A second abdominal hysterotomy was therefore decided upon.

On December 12, 1934, an abdominal hysterotomy and a bilateral salpingectomy were performed. The size of the uterus was found to be that of a three and a half months pregnancy. Both ovaries were normal.

FIG. 1





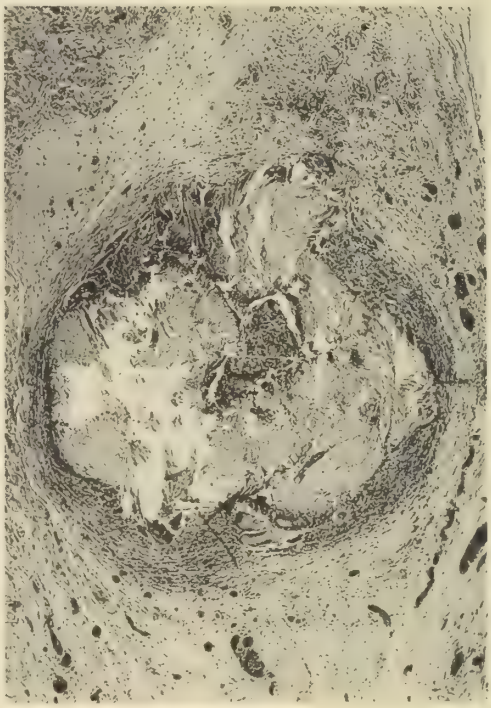


FIG. 2 FIG. 3

FIG. 1. Long section of right tube showing restoration with minimal residual signs of previous operation.

FIG. 2. Sample of serial longitudinal sections of left tube showing tortuous course of lumen, patent at four places, at least through its length.

FIG. 3. Enlarged cross section of left tube, showing foreign body giant cell reaction around a silk suture, evidence that the tube was ligated.

The right tube appeared to be perfectly normal. The central portion of the left tube showed a very slight narrowing at the site of the previous excision. Not the slightest trace of an adhesion could be found in the

pelvis. A 10 cm. embryo was removed, and the uterus repaired by layer sutures. Both tubes were excised with due precaution not to interfere with the ovarian circulation. The uterine stumps were inverted and peritonealized.

The postoperative course was uneventful until the ninth day, when the patient became noisy, incoherent and difficult to control. A postoperative psychosis in the nature of an exacerbation of a preëxisting psychosis was diagnosed by the psychiatrists. She improved rapidly and was discharged three weeks after operation into the custody of the social service agency.

The report of laboratory findings by Dr. Paul Klemperer was as follows:

Grossly, the tubes present a normal appearance, showing no adhesion to the serosal surface. The left tube measures 5 cm. in length, the right 6 cm. Both tubes are easily patent to the very gentle passage of a lacrimal probe. Longitudinally, the section of the right tube shows a normal mucosa and a free lumen (Fig. 1) except for one area where some inspissated pink material with a few lamellated calcium concrements was found. The muscular coats show no changes. There is no evidence of foreign body reaction. The left tube shows an apparently tortuous course. In the longitudinal section the lumen was cut across four times (Fig. 2), once longitudinally and three times transversely. None of the serial sections showed a continuous course of the tube. The sections show a nodule in which a ligature was seen to be surrounded by foreign body reaction (Fig. 3). Though the histological examination does not add much in regard to the question of the continuity of the tube, the patency of the lumen was evident by the gross examination. There was no evidence to suggest endosalpingiosis as the mechanism of tubal reconstruction.

COMMENT

The literature on sterilization by operative procedures on the Fallopian tubes describes a variety of methods and modifications. They vary from the simple ligation, as first carried out by Blundell (1) in London in 1825, to the more modern techniques of excision, crushing and suturing of the tubes and peritonealization of the stumps.

In 1892, Falaschi (2) reported the first failure in a case of tubal ligation. Since then a large number of techniques have been described in greater detail. Various techniques have been combined in all possible permutations and each of the resulting methods has been dignified with the name of some gynecologist.

An exhaustive study of sterilization operations and subsequent failures was published by Nürnberger (3) in 1917. In his opinion the operative procedures are governed mainly by conditions indicating the sterilization operation. He found that the major part of the failures was due to sutures insufficiently secured or too snugly tied. It is practically impossible to

ligate a tube sufficiently snugly to obliterate the lumen without exerting sufficient force to cut through tissues.

The Madlener (4) method, that is, the crushing and suturing of the tubes has been much in vogue. The largest series of sterilization operations reported have been performed with this technique or the Waser (5) modification of it. Over 500 cases have been reported with only a few failures known so far. In a recent paper Rubovits and Kovak (6) reported two cases of pregnancy following sterilization by the Madlener method. In one of these cases the authors think that the recovery of patency occurred through an endosalpingiosis, shunting the crushed and ligated loop. In the other, the tube seemed to have recovered function because of the cutting of the ligature through the one loop. The authors join others in their belief that iodized oil should be employed to test the success of the sterilization operations. Greenhill (7) recommends a postoperative inflation test. Both of these procedures, however, favor somewhat the restoration of patency and should be employed only when the greatest caution is used in the control of the pressure which must not exceed 130 mm. of mercury.

Zweifel used electrocautery on the tubal stumps so as to prevent the restoration of patency.

Müller (8) cites 793 cases of tube sterilization operations with 34 known failures. By excluding the 511 cases of Madlener operation, he then calculates that the failures with all other methods of tubal sterilization is 17 per cent. One must, however, realize that the various operative techniques have been greatly improved in recent years. Also the high proportion of failures with tubal operations does not present a true state of affairs, since by no means have all of the sterilization operations been reported. Jaroschka (9) reports 194 consecutive cases of partial resection and peritonealization of stumps with no known failures. A careful check-up on this material has been made. The Müller material covers the literature only up to 1926, and it is fair to say that progress in techniques has been made within the last ten years.

Fraenkel (10) believes, after an exhaustive study of all material on hand up to 1930, that the only safe and lasting operation is the excision of the tubes at the cornua of the uterus with subsequent careful musculo-muscular and seroserosal closure. He believes that ligation, crushing, excision and even peritonealization offer no guarantee for the permanency of tubal patency.

Several hundred tubal ligation operations have been performed at this hospital, and to date only three failures have come to our attention. This, however, is the first case in which a reoperation afforded an opportunity to examine the tissue. There may have been other failures in cases inadequately followed or admitted to other institutions. The method used at this hospital is a modification of the technique of Hans (11) and Kohler

who tie off a loop of the tube. In addition, we resect the redundant portion of the loop. From the pathological studies undertaken in resected tubes following failures as well as in animal experimentation, one comes to the conclusion that a variety of factors play a part in the actual closing of the tubes. A complete closure of the lumen is practically impossible to arrive at with any type of ligature. If tied too tightly, the ligature cuts through, salpingo-peritoneal fistulae form, the divided ends reunite, displaced and extraperitonealized tubes retract as a result of uterine mobility and tubal peristalsis and antiperistalsis. The knotting of the tube which has been performed on the principle of the "knotted ureter" involves a possibility of necrosis as a result of the inevitable interference with the blood supply while operating.

It is quite true that the method suggested by Fraenkel, that is, tubal excision, offers certain theoretical advantages, but the few failures with our simpler technique and its minimal operative risks justify our preference for the technique we employ.

REFERENCES

(1) Blundell, J.: Researches, Physiological and Pathological; Instituted Principally with a View to the Improvement of Medical and Surgical Practice. London, E. Cox & Son, 1825.

(2) Falaschi: Zwei konservative Kaiserschnitte an derselben Frau. Zentralbl. f. Gynäk. 16: 774, 1892.

(3) Nürnberger, L.: Die Sterilisierenden Operationen an den Tuben und ihre Fehlschlage. Leipzig, J. A. Barth, 1917, pp. 33–114.

(4) Madlener, M.: Über Sterilisierende Operationen an der Tube. Zentralbl. f. Gynäk. 43: 380, 1919.

(5) Waser, B.: Die Tubensterilization nach Madlener. Zentralbl. f. Gynäk. 49: 2327, 1925.

(6) Rubovits, W. H., and Kovak, A. J.: Failures in Tubal Sterilization (Madlener). Am. J. Obst. & Gynec. 27: 12, 1934.

(7) Greenhill, J. P.: Pathology of Pregnancy. Practitioner's Library of Medicine and Surgery, 6: 241, 1934.

(8) Müller, P.: Über die Erfolgssicherheit der Tubensterilization. Inaugural Dissertation, University of Erlangen, 1931.

(9) Jaroschka, K.: Die Erfolge der Sterilisierungen bei Interpositio uteri und im Anschluss an die Entleering des schwangeren Uterus. Arch. f. Gynak. 144: 318, 1931.

(10) Fraenkel, L.: Die Empfängnissverhütung. Stuttgart, Ferdinand Enke Verlag, 1932.

(11) Hans, H.: Quoted by Fraenkel (10).

A CASE OF SEPTIC THROMBOPHLEBITIS OF THE LEFT COMMON ILIAC VEIN AND ITS TRIBUTARIES DUE TO STREPTOCOCCUS HEMOLYTICUS; SPONTANEOUS RECOVERY

JOSEPH B. STENBUCK, M.D.

[*Surgical Service of Dr. Ralph Colp*]

CASE REPORT

History (Adm. 380650). The patient, a 54 year old man, entered the hospital June 5, 1935. Two and a half years previously an injury to his left shin resulted in an infected wound which required treatment for more than a year. Six weeks before admission the patient suddenly developed headache, dizziness, and his temperature rose to 104°F. The next day swelling and redness were noted in the calf of the left leg, spreading up the thigh. He was taken to another hospital where for six weeks he presented features of severe sepsis. The temperature varied between 103°F. and 105°F., and was accompanied by a rapid pulse, profuse sweats, and prostration. At times he was disoriented and irrational. Several fluctuant areas were noted on his left leg; they were incised and pus was obtained. Incisions in the thigh revealed no pus but only edematous tissue from which serum drained freely.

Clinical Course. On admission to The Mount Sinai Hospital he was found to be acutely ill and markedly emaciated. Except for the rapid rate, the heart was negative. There were râles at both bases. There were numerous incisions on the edematous left leg and thigh. The white blood cell count was 23,800 with 88 per cent polymorphonuclear leucocytes; the hemoglobin was 52 per cent. Seven blood cultures between June 5, the day of admission, and June 28 revealed streptococcus hemolyticus in all flasks and plates.

It was thought that the patient was suffering from a thrombophlebitis of the femoral vein which continuously fed the blood stream with bacteria. It was, therefore, considered advisable to ligate his external iliac vein in order to prevent further dissemination of infection from the femoral vein. The operation was performed by an extraperitoneal abdominal approach. The external iliac and the common iliac arteries were found tortuous and sclerotic but otherwise negative. The external iliac vein and thence the common iliac vein were traced up to the vena cava and throughout their course they presented a stiff, non-compressible mass. A phlebitis and a periphlebitis with edema were present. Aspirations of the common iliac vein close to the vena cava yielded no blood but only a few drops of sero-

sanguineous fluid. This was cultured and later revealed streptococcus hemolyticus. Under these conditions the operation was completed without ligating the veins. The diagnosis was changed to septic thrombophlebitis of the left common iliac vein.

The patient continued to run a septic course. Ten blood transfusions were given between the day of admission and July 12. Blood was given



In spite of thrombosis of the left common iliac vein and many tributaries up to the vena cava, the edema is comparatively slight. The incisions in the leg represent abscesses which were evacuated. These abscesses were due apparently to a thrombophlebitis of the superficial veins. The incisions in the thigh, however, revealed no pus but only thrombosed veins.

in spite of the fact that his hemoglobin rose to 75 per cent. At first, he seemed to be declining rapidly. He was at times alternately comatose and irrational and became more and more toxic and cachectic. Frequently he was very restless, necessitating the administration of narcotics. His sclerae became subicteric; herpetic lesions appeared on his lips; the heart sounds became poor; a large decubitus ulcer appeared on the left buttock;

the liver became enlarged to an inch and a half below the costal margin. There were moist râles in the right lower lobe and an X-ray examination of the chest showed "a few small pneumonic infiltrations in the lower portion of the right lower lobe." A chronic lymphedema persisted in the leg and advanced upward over the left lower quadrant of the abdomen.

After three and a half weeks the persistently high temperature suddenly subsided and remained at a normal level. This marked a change in the patient's condition, which improved progressively though slowly. During the convalescence a localized abscess developed in the left groin which was incised and drained. Culture of the pus showed streptococcus hemolyticus and B. Welchii. Clinical signs of a pyarthrosis of the left elbow appeared but disappeared without operative interference. Somewhat later an abscess developed on the anterior portion of the right chest which was incised and from which streptococcus hemolyticus was recovered. Specific agglutinations against anti-scarlet fever serum with the streptococcus which had been isolated from the patient's blood were found to be positive to a very high titer. This serum was to be employed, but due to the spontaneous fall in temperature and the improvement in the patient's condition, its use was abandoned.

When seen in December 1935, the patient appeared to be quite well. He had gained over thirty pounds in weight. He still had moderate edema of the left leg (see accompanying figure). There was some stiffness of the knee and the hip joints.

SUMMARY

A case of thrombophlebitis of the left common iliac vein with streptococcus hemolytic sepsis is described. Operation was attempted in order to obtain vein ligation above the area of thrombosis and to prevent dissemination of the infection. This was technically impossible because the common iliac vein was completely thrombosed up to the vena cava. Nevertheless, spontaneous recovery occurred. The treatment consisted mainly of frequent blood transfusions to combat anemia and sepsis, rest in bed, and administration of morphine in order to conserve the patient's energy.

CLINICAL PATHOLOGICAL CONFERENCE

Wednesday, November 20, 1935

GEORGE BAEHR, M.D., AND PAUL KLEMPERER, M.D., *presiding*

Case 1. Acute myeloblastic leukemia (From the Medical Service of Dr. George Baehr)

History (Adm. 382898). The patient, a 14 year old Italian girl, was admitted to the hospital complaining of rapidly increasing swellings on each side of the neck, sore throat and slight difficulty in swallowing of four days' duration. During the month preceding her admission she experienced infrequent occipital headaches, which lasted from one to twelve hours, and one week before admission she developed a slight non-productive cough.

Examination. The patient was well nourished and well developed. The pharynx was reddened and edematous; the tonsils were enlarged, reddened and cryptic. There were scattered, firm, discrete, tender, enlarged cervical nodes, especially in the region of the mandibular angles. There were similar axillary nodes and shotty inguinal lymph nodes. Examination of the chest revealed no abnormalities except a systolic murmur over the pulmonic area. The blood pressure was 120 systolic and 70 diastolic. The edge of the spleen was firm and palpable two fingers below the costal margin. The hemoglobin was 65 per cent; the red blood cell count was 4,720,000 per cu.mm. Blood platelets numbered 90,000. The white blood cell count was 250,000 per cu.mm.; myeloblasts, 95 per cent and myelocytes, 5 per cent. The heterophile reaction was negative. A bone marrow puncture disclosed a hyperplastic marrow consisting entirely of myeloblasts. The blood Wassermann test was negative. The blood urea was 11 mg. per 100 cc. The blood sugar was 70 mg. per 100 cc. The urine was negative.

Course. The temperature gradually rose to 104.4°F. The pain on swallowing and the pharyngeal reddening remained, while the cervical lymph nodes steadily increased in size. A small dose of high voltage X-ray given to the neck was of no benefit. The patient declined progressively, and died six days after admission.

Post Mortem Findings. The breasts were large for the patient's age. All lymph nodes were markedly increased in size, occasionally to four times their normal dimensions. They were discrete but soft. The thymus was also considerably enlarged; it was firm, coarsely lobulated and its sectioned surface presented many hemorrhagic and necrotic foci. The spleen weighed 650 gm. and its cut surface showed enlarged grayish-red Malpighian follicles. The liver weighed 2300 gm. and on section presented innumerable zones of infiltration. The surfaces of the kidneys revealed many firm, white, 1 to 5 mm. nodules. The uterus was enlarged to about the size of a three months pregnancy. Its wall was markedly thickened and presented fine parallel reddish streaks. The stomach mucosa showed several erosions; the Peyer's patches were hyperplastic and hemorrhagic. The wall of the appendix was diffusely and moderately thickened. Microscopic sections revealed a universal and very marked infiltration of myeloblastic cells in all

viscera including the breasts and uterus. The spleen and lymph nodes further evidenced complete effacement of architecture.

Comment. Dr. Klemperer pointed out that lymph nodes in acute myeloid and lymphatic leukemia are very frequently enlarged and that in the acute leukemias, therefore, lymph node enlargement could not be employed as a diagnostic feature. Occasionally, as this case very amply demonstrated, the breasts and uterus become infiltrated. He recalled another instance observed in this laboratory in which uterine myomata were the seat of a leukemic infiltration. The widespread cellular infiltrations, not only in tissues which are normally adult centers of hematopoiesis but also in those not usually the seat of postnatal hematopoietic activity, could be accounted for in one of two ways: the cells were possibly colonized in these organs via the blood stream, or perhaps the mesenchymal tissue of these organs regained its embryonic ability to form hematic cells.

Dr. Baehr believed it improbable that the profound anatomical changes had all occurred in a period of ten days (if the appearance of the cervical swelling is to be regarded as the onset). He pointed out that the patient complained of occasional occipital headaches and cough for one month prior to admission and thought it very likely that the disease existed without causing symptoms of diagnostic value.

Case 2. Generalized hemoblastosis (*From the Pediatric Service of Dr. Bela Schick*)

History (Adm. 383614). The patient, a nine year old white boy, was well until two months prior to his admission to the hospital when he began to limp and complained of pain in the right lower extremity, frequently localized to the right knee. The diagnosis of rheumatism was made. Five weeks later a roentgenogram of the hip led to the suspicion of tuberculosis. Because of pain in muscles of the lower extremities, he was confined to bed. The pain was especially severe during the week before hospitalization. Somewhat more recently swelling of the abdomen was noted. There had been a weight loss of ten pounds.

Examination. The boy was well developed but appeared undernourished and complained frequently of severe pain in the right thigh. There was a right facial weakness, inability to rotate the right eye externally and bilateral temporal pallor of the discs. Examination of the chest revealed only a systolic apical cardiac murmur. The lungs were negative. The abdomen was distended. A hard, nodular mass was palpated in the left upper quadrant and lumber regions. It extended to just below the level of the umbilicus. A similar, but softer, mass was palpated in the right abdomen. It appeared to be separate from the liver. A hard and tender mass was also palpable along the right side of the rectum. The lymph nodes of the posterior cervical chain were enlarged and matted together while the anterior cervical nodes were discrete. There were also discrete, nontender axillary and inguinal nodes. The right lower extremity was held in flexion and external rotation, and its circumference was six inches greater than that of the left. An attempt to elicit a Kernig sign provoked severe pain. Among the diagnostic possibilities suggested was neuroblastoma with metastases, hypernephroma or adenomyosarcoma of the kidney (Wilms's tumor).

The blood hemoglobin was 65 per cent; the red blood cell count was 3,520,000 per cu.mm., the white blood cell count 9,200 per cu.mm., polymorphonuclear leucocytes 65 per cent. Urinalysis showed poor variability of specific gravity, a two plus albuminuria, a few white blood cells in clumps and rare red blood cells. Phe-

nolsulphonphthalein excretion was 30 per cent in two hours. Blood calcium was 11.1 mg. per 100 cc., and blood urea 35 mg. per 100 cc. The blood pressure was 158 systolic and 122 diastolic.

X-ray examination of the skeletal system revealed definite changes only in the right ischium. Here there were irregular mottling and erosion of the inferior cortex. Intravenous pyelogram showed a small amount of dye in the left kidney pelvis and also in one of the superior and inferior calyces. On the right side only a small amount of dye was noted in the renal pelvis. The ureters were not outlined.

Course. One week after admission the patient became drowsy; there developed neck rigidity, papilledema, paralysis of the right external rectus muscle, paresis of the left external rectus, and left facial weakness. In view of these symptoms, a lumbar puncture was performed and cerebrospinal fluid, "ground glass" in appearance, containing white flakes, was obtained. The cell count revealed 1350 round cells. The temperature, which was normal on admission, rose gradually and steadily to 104°F. Blood cultures were negative. The anemia, drowsiness, asthenia became more marked, and the abdominal masses increased in size. The patient died at the end of the third week in the hospital.

Post Mortem Findings. The abdominal cavity contained 200 cc. of a turbid yellow fluid. There were large nodular retroperitoneal tumors in both lumbar regions and a firm tumor mass, 7 by 5 cm., invading the right iliac bone. A similar mass was found in the pelvis on the right side of the rectum. The mass enveloped a large nerve, was attached to the descending ramus of the ischium, had invaded the bone and partially occluded the obturator foramen. Another mass was found in the left iliac fossa, 3 cm. in diameter; this had invaded the psoas muscle and iliac bone. There were numerous enlarged abdominal lymph nodes. The sectioned surfaces of the nodes and tumor masses were soft, white, occasionally hemorrhagic. The right kidney weighed 680 gm., the left 740 gm. Their capsules were irregularly and moderately thickened. The cortical surfaces showed numerous, diffusely distributed, moderately firm, yellow, circumscribed nodules. On section, their markings were hardly discernible because of the very numerous nodular infiltrations (Fig. 1). Both renal pelves were ensheathed by firm, yellowish-white, tumor-like tissue. The gastric mucosa and submucosa revealed irregular nodular, completely annular, submucosal infiltration, 4 cm. in length. A similar but less extensive zone of infiltration was found in the terminal ileum. The spleen weighed 175 gm. (about twice normal size). The sectioned surface presented diffusely distributed, slightly raised, gray-pink zones of cellular infiltration. The follicles could not be made out with certainty. The pancreas was markedly enlarged, very firm, and on section evidently diffusely infiltrated. The lungs presented patchy pneumonic foci. The left adrenal gland was partially infiltrated. The bodies of the third and fourth lumbar vertebrae were partially replaced by the gray amorphous tissue.

Comment. It was pointed out by Dr. Klemperer that the case offered features which, while highly suggestive of lymphosarcoma, because of the generalized infiltration rather favored the diagnosis of leukemia. The spleen lost the basic microscopic markings completely, due to the diffuse infiltration by cells of a size larger than lymphocytes. The bone marrow showed a similar infiltration by a uniform cell type and absence of erythroblasts and megakaryocytes. The kidney displayed a like infiltration. These cells were designated hematic cells, probably

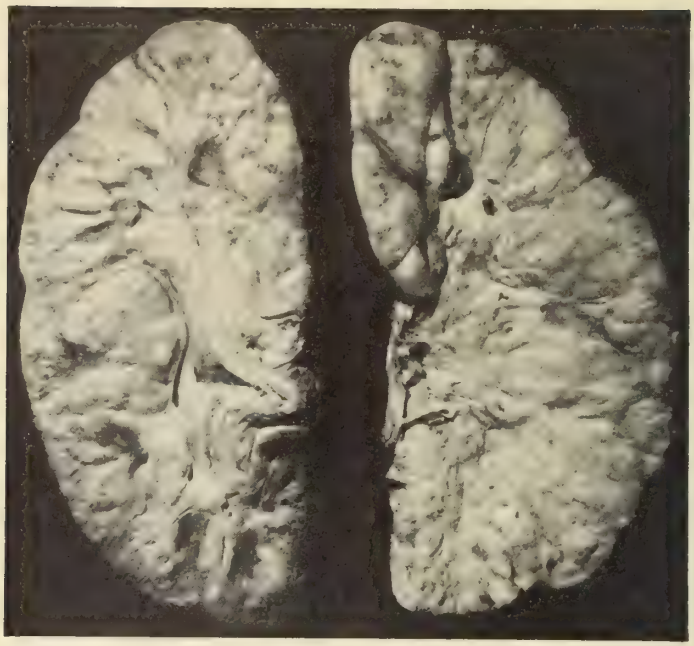


FIG. 1. Case 2. Sectioned surface of each kidney, presenting diffuse infiltration.

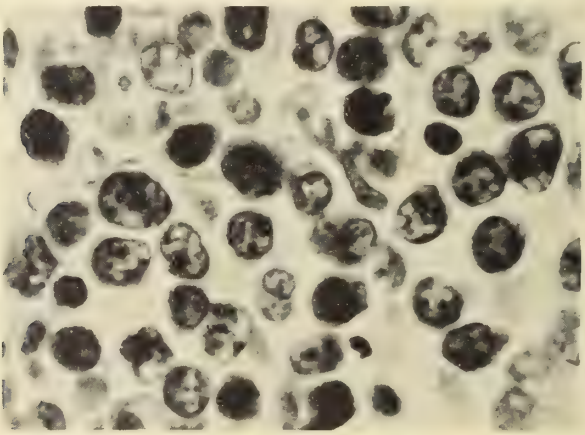


FIG. 2. Case 2. Oil immersion microphotograph of a small lymph node to show cell type.

hemocytoblasts (Fig. 2). Thus the diagnosis suggested was hemoblastosis. The term "hemoblastosis" was first proposed by Orth to denote a process characterized by a very diffuse production of hematic cells. The term was generic and denoted

both typical hyperplasias and atypical proliferations. This term included then all the morbid conditions of the hematopoietic mesenchyme except the granulomatous forms of lymph node disease (e.g. Hodgkin's disease). It was felt that the term hemoblastosis could well be reserved for those transitional cell forms, of which the preceding case was a good example, where the distinction between hyperplastic and aggressive tendencies could not be clearly defined.

Case 3. Generalized lymphosarcomatosis with predominant gastric involvement (From the Surgical Service of Dr. Ralph Colp)

History (Adm. 381725). The patient, a 44-year old white male, was well until seven weeks prior to admission to the hospital, when he began to complain of gradually increasing fatigue, anorexia and weakness. He also noted nausea and some epigastric discomfort unrelated to meals. He occasionally vomited immediately after eating. There was a loss of fifteen pounds of weight.

Examination. The patient appeared chronically ill. There was slight tenderness and a vague sense of a mass in the epigastrium. A gastro-intestinal X-ray series showed a gastric defect. The blood count showed a mild secondary anemia with 3,500,000 red blood cells per cu.mm., 18,200 white blood cells per cu.mm. and 68 per cent hemoglobin. The differential white blood count was normal. Stool examination gave a four plus guaiac test. The blood pressure was 110 systolic and 70 diastolic. Urinalysis was negative.

Course. An attempt at gastric aspiration was followed by hematemesis of about 5 ounces of bright red blood. The suspected gastric malignancy was confirmed at laparotomy and the stomach and duodenum were partially resected (specimen described below). The patient ran a rather persistent febrile course, developed a slight wound infection and evidence of a pneumonic process in the left lower lobe. Blood cultures were negative repeatedly. Six days following operation, the patient developed slight scleral icterus and 1 plus bile in the urine. The icteric index varied from 15 to 20 and the wound discharge was slightly bile-stained. In spite of frequent transfusions the patient became progressively worse, and died six weeks after entrance to the hospital.

Post Mortem Findings. (Operative specimen.) The serosal aspects of the anterior and posterior gastric surfaces near the lesser curvature presented many smooth, hard, raised nodules, varying in diameter from 2 mm. to 1.5 cm. The gastric mucosa revealed a defect, 6.5 by 8 cm., straddling the lesser curvature (Fig. 3). The distal edges were raised, irregular, sharp and firm, whereas the proximal edge merged with the thickened congested mucosa. There was a chronic penetrating peptic ulcer along the posterior duodenal wall which at operation was found entering the head of the pancreas.

At necropsy the linear operative scar contained the openings of fistulous tracts which communicated with a bile-stained cavity. The gall-bladder, via a small tract, also communicated with this cavity which was bounded inferiorly by adhesions, anteriorly by a portion of the inferior surface of the liver, posteriorly and superiorly by the stomach, head and portion of the body of the pancreas. A smaller bile-stained cavity situated at the junction of the greater curvature and inferior hepatic surface also communicated with the cavity described before. The liver was enlarged, weighed 2000 gm., and its inferior surface was partially covered with adhesive bands. Its sectioned surface presented many glistening white

nodular areas (pinpoint to 4 mm.). The spleen weighed 700 gm. (about five times normal size) and revealed on section numerous gray-white, opaque nodules from pinhead to 4 mm. in size. The kidneys also showed scattered small gray nodules. The lymph nodes were generally enlarged and firm. There was a bilateral patchy broncho-pneumonia and chronic interstitial mitral valvulitis. Microscopically, the stomach, spleen and lymph nodes, as well as the liver, showed many diffuse and nodular zones composed of reticulum cells with frequent mitotic figures and structural atypism.

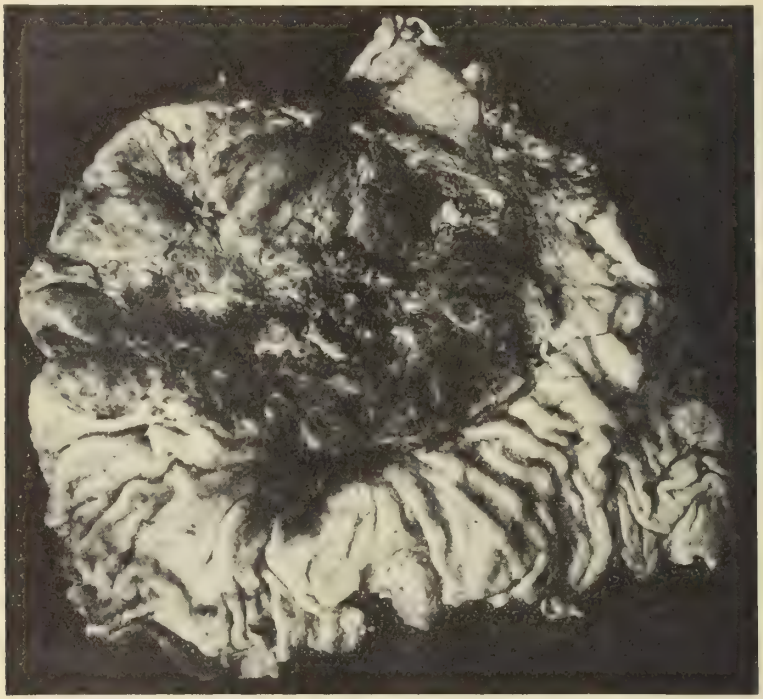


FIG. 3. Case 3. Lymphosarcoma of the stomach. Few gastric lymph nodes also involved.

Comment. Dr. Klemperer emphasized the diffuse hyperplasia and infiltration of reticulum cells and designated the case as a reticulosis with neoplastic features. He pointed out that these were precursors of hematic cells and that this case, therefore, might possibly be included with hemoblastosis.

Case 4. Chronic ulcerative colitis and peritonitis (From the Surgical Service of Dr. Harold Neuhof)

History (Adm. 384724). The patient, a white 17 year old female, was well until nine months before hospitalization when she began to pass small amounts of blood by rectum. The number of daily stools increased to 8 to 10 and were soft, bloody and mucoid in character. The patient gradually lost strength, experienced fre-

quent cramp-like abdominal pain, vomited occasionally and lost twenty pounds. Her temperature was elevated at times. A physician was not consulted until one week before admission, when he referred the patient to the hospital.

Examination. The patient was a pale, sickly, thin girl, appearing acutely ill. The abdomen was soft, thin, not distended but diffusely tender. The edges of the liver and spleen were just palpable. There were 3,800,000 red blood cells per cu.mm., 29,500 white blood cells per cu.mm. and 35 per cent hemoglobin. The differential white cell count revealed 85 per cent polymorphonuclear leucocytes. The total blood protein was 3.5 (albumin 2.1, globulin 1.4). The stool guaiac test was 4 plus and the stool culture showed Bacillus pyocyaneus and B. Coli. The dysentery agglutinations were: Flexner to 1:80, Mt. Desert to 1:160, other types 0.

Course. In spite of the low total blood protein (3.5) there was no edema during the early period of her stay in the hospital. The temperature throughout the first two weeks fluctuated irregularly between 99.2° and 103.6°F. During the last week of her illness, the temperature curve was more sustained between 102° and 104.8°F. The patient was given a course of emetine, glucose and saline intravenously, repeated transfusions and a course of B. Coli serum. In spite of these measures her condition remained unabated. The course continued relentlessly on the decline; her diarrhea persisted and she developed petechiae, buccal ulcerations, edema of extremities and back, and a sacral decubitus ulcer. An ileostomy was performed twenty-eight days after admission. Upon incision of the peritoneum, however, there was a gush of thin, purulent fluid which contained flakes of fibrin. A loop of ileum was brought out and kept in place over a glass rod. Three hours after operation the temperature rose to 106.4°F.; the abdomen became distended and the patient succumbed. The entire length of the illness was ten months.

Post Mortem Findings. The large intestine and appendix in their entirety presented diffuse mucosal reddening and ulceration. In the cecum and ascending colon all that remained of mucosa were many interlacing shreds which frequently formed bridge-like structures. The remainder of the colon was even more severely affected and in these, portions of muscularis could be seen readily. A small perforation was found in the posterior wall of the rectosigmoid. This had produced an acute generalized fibrinopurulent peritonitis. The heart presented a slightly thickened mitral valve with recent fresh red verrucae. There were also pulmonary edema, bilateral hydrothorax, hydropericardium and partial collapse of the lungs.

Comment. The opinion was offered that thinning of the intestinal wall in chronic ulcerative colitis might be conducive to the development of a migratory peritonitis. However, the peritonitis in the case presented was due to actual perforation. The endocardial vegetations represented a terminal endocarditis. There was no morphological evidence of a rheumatic cardiac infection. The presence of staphylococcus aureus on the verrucae was felt to be a contaminant. Dr. Klemperer recalled two previous cases in which the enterococcus was found to be the causative agent of the endocarditis and offered the opinion that there, too, the process was most likely terminal. The possibility that a verrucous lesion of this type might be toxic was alluded to.

In the opinion of Dr. Baehr the term, non-specific ulcerative colitis, does not refer to a disease entity. The condition would be better termed ulcerative colitis —etiology not specified. In some of these cases the colitis was amoebic in origin

and the amoebae could not be demonstrated or were found only at necropsy. The dysentery bacillus, he felt, was frequently responsible as the primary inciting agent and referred to the work of Felsen, who recently, on the basis of extensive bacteriological, serological, and epidemiologic studies, reëmphasized the importance of the association of the dysentery bacillus with ileocolitis. He further stated that some of the instances of colitis seen lately in New York City were undoubtedly related, directly or indirectly, to those observed in the recent New Jersey epidemic.

Reported by Henry Horn, M.D.

VOLUME III SEPTEMBER-OCTOBER, 1936 NUMBER 3

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

PAVLOV, THE PSYCHIATRIST OF THE FUTURE[1]

H. S. LIDDELL

[*Cornell University, Ithaca, New York*]

In commemorating Professor Ivan Petrovich Pavlov it seems most fitting to pass in review certain scientific topics, the examination of which afforded him the liveliest experience of the reality and worth of his own efforts. I shall speak briefly of his prejudices, of his physiological method as a necessary consequence of those prejudices, and finally, of the probable influence of his investigation of conditioned reflexes upon the future development of psychiatry.

Pavlov was a man of sturdy prejudices which guided his thinking and motivated his experimenting throughout a strenuous and distinguished career. Sir Edward Sharpey-Schafer once said that the task of science is to count, to weigh, and to measure. It was Pavlov's firm belief that no branch of medicine, not even psychiatry, may be excused from the performance of this task. As a young physiologist, he developed a strong prejudice in favor of the chronic experiment as opposed to the acute experiment. He believed that a terrified or suffering animal could contribute little of value to physiology or medicine. To his mind, careful training of an animal and its friendly coöperation were the essentials of sound physiological research. Through a long life of experimentation, first upon digestive function and then upon nervous function, he adhered to this prejudice or conviction.

In his study of the nervous control of digestive secretion Pavlov devised an ingenious series of surgical procedures for isolating and collecting various digestive juices. In his study of pancreatic and gastric secretions it was necessary to collect them from fistulae in the dog's belly wall. For this purpose he found it most convenient to teach the dog to stand quietly in a special frame with loops under its legs, often for many hours. Since an essential part of the whole experiment was the gentling of the

[1] An address delivered at the Blumenthal Auditorium, The Mount Sinai Hospital, New York City, March 24, 1936, at a meeting in commemoration of the late Professor Ivan Petrovich Pavlov.

dog, it became accustomed to standing quietly upon the table, and with a headrest, even to sleeping comfortably.

Pavlov soon discovered that appetite occasioned the first outpouring of gastric juice in the dog. His bold treatment of this psychological factor in digestion clearly shows the guiding influence of his prejudice in favor of quantitative observation. In a lecture published in 1897 Pavlov says, "On the last occasion we made ourselves acquainted with the first normal impulse which, in the natural course of events, calls into activity the innervation apparatus of the gastric glands. This impulse is a mental one, and consists of a passionate longing for food, that which in every-day life, and in the practice of the physician, is called 'appetite,' and which everybody, both medical and lay, endeavors carefully to promote. We may now venture to say explicitly, *appetite is juice.*"

This resolute treatment of mental life in terms of the measurable products of physiological action characterized not only Pavlov's investigation of digestive function but also his experiments upon the functioning of the normal and disordered central nervous system. In examining the mechanism of salivary secretion the operation of psychological factors was again encountered and now offered an even greater challenge to Pavlov's point of view. The flow of saliva in his dogs did not wait upon the introduction of substances into the mouth, but rather the sight or smell of food or the various accompaniments of feeding served to arouse an anticipatory flow of saliva. After a long mental struggle Pavlov finally decided to adhere to his usual physiological procedure in the investigation of *all instances of salivary secretion.* This epoch-making decision to describe psychical action in terms of reflex action appears in his address on "Experimental Psychology and Psychopathology of Animals," read before the International Congress of Medicine at Madrid in 1903.

"Can all this seeming chaos of relations be included in a certain scheme? Is it possible to make the phenomena [of salivary secretion] constant, to discover the laws which govern their mechanism? The examples which I shall present now give me the right, I think, to answer these questions categorically, 'Yes,' and to find at the basis of our psychical experiments always the same special reflexes as the common mechanism. In its physiological form our experiment—provided, of course, all extraordinary conditions are excluded—always gives the same results; this is an *unconditioned reflex.* The main characteristic of the psychical experiment is the inconstancy of its results and its apparent capriciousness. The results of a psychical experiment, however, recur with more or less constancy, otherwise we could not speak of it as a scientific experiment. The difficulty of the psychical experiment lies in the greater number of factors which must be considered. Thus the reflex obtained is *conditioned.*"

Since the dogs in Pavlov's laboratory were accustomed to standing in harness upon a table the experiments on salivary secretion were conducted

in like manner, the parotid saliva being collected from a funnel cemented to the animal's cheek. The method of the conditioned reflex was soon demonstrated to be a reliable means of testing sensory discrimination. For this purpose stimuli were selected some of which signalled the approach of food and others, no food. The trained dog indicated its positive or negative anticipation by secretion or no secretion.

In the course of such experiments during the summer of 1914 one dog exhibited a sudden and striking change in behavior as a consequence of attempting to discriminate between a circle and an oval of the same area projected upon a screen. The circle was a signal for food. The oval indicated that no food was to be given. At first the axes of the oval bore the ratio of 1 to 2 but it was gradually made more and more circular. Finally, when the axes were as 8 to 9, the dog, which had formerly stood quietly, became highly excited, struggling and howling, and salivated equally in response both to oval and circle. Careful reëducation, beginning with the 2 to 1 ellipse as the signal for no food, gradually restored the animal's normal poise although the development of this coarse discrimination progressed twice as slowly as at first. Finer discriminations were mastered even more rapidly than before until the dog attained its former level of achievement but after a single differentiation of the 8 to 9 ellipse from the circle the animal relapsed into its former state of extreme general excitation. Although further work with this animal was abandoned, Pavlov says, "After these experiments we paid considerable attention to pathological disturbances in the cortical activity and began to study them in detail."

Subsequently many similar cases of pathological disturbance of behavior were described and Pavlov's designation of the condition as "experimental neurosis" is now generally accepted. The experimental neurosis may manifest itself not only as persistent hyperexcitability but also as a chronic passive resistance against the experimental routine where the dog promptly falls asleep at the beginning of the daily tests.

Although the experimental neurosis has, in recent years, been frequently reported in the course of learning experiments with the rat, cat, sheep and chimpanzee, and with a variety of training methods, it must be remembered that Pavlov was the first to develop a reliable method for precipitating the neurosis at will, and under conditions accurately described and easily reproduced.

The fundamental conditions are restraint and confusion. The dog learns to stand quietly in the frame and restraint, at first imposed from without, is gradually imposed by the animal upon itself. It gives up freedom and initiative. When signals for food and for no food are confusingly similar or their time relations are perplexing the animal can not evade the issue but suffers nervous strain (or in human terms, apprehension or worry). The end point of such an experiment is the onset of the experi-

mental neurosis. The dog has succumbed to an experimentally produced mental disorder.

We have come to appreciate from Pavlov's studies that the dog's life is characterized more by anticipation than by realization. This, also, must be our belief concerning man; that he is less swayed by present rewards and punishments, satisfactions and annoyances, than by doubts, worries, beliefs and hopes.

With what confidence may we look forward to comparing the simple history of a dog's disordered behavior to a psychiatric case history? The certainty seems great even though remote. Mammalian nerve fibers of like size conduct nerve impulses at like velocities even though one is from man, the other from cat. It is not unreasonable to believe that there are fundamental time-constants common to the behavior patterns of all mammals.

If this assumption proves to be correct, the problem of mental illness may be attacked through the quantitative estimation of action rather than through the elusive, qualitative aspects of conduct. Man speaks and writes and in so doing shares in the cultural life not only of the present but of the past. The case history of the patient suffering mental disorder involves the skilled analysis of his social values, experiences and imaginings. It is a history composed of imponderables. The animal's case history concerns only its own life span. The experimenter provides measurable and controllable laboratory situations with which to test its capacity for adjustment.

Ships bear the Plimsoll mark in order that safe loading may be assured. If the vessel embarks upon her voyage with her marks submerged, all may go well. But if she encounters heavy weather, not all the master's skill can keep her afloat.

The cardiologist of today can furnish the physician simple diagnostic rules by which he may establish his patient's Plimsoll mark with respect to the safe loading of his cardiovascular system. This the psychiatrist can not do. He is the captain called too late upon the bridge when shipwreck is inevitable. But what of the psychiatrist of the future? Pavlov's uncomprising labors give us confidence to expect that it may be possible to derive a psychiatric Plimsoll mark so that the general practitioner may confidently predict for his patient a happy and successful voyage through the turbulent currents of social and economic life.

THE TREATMENT OF PERSISTENT BRONCHIAL FISTULA AND CHRONIC EMPYEMA

JOHN H. GARLOCK, M.D.

[*Surgical Service of Dr. Harold Neuhof*]

The satisfactory solution of the problems presented by the following cases merits a report of the procedures employed and a discussion of the indications for their use.

CASE REPORT

Case 1 (Adm. 373603). This patient was first admitted to The Mt. Sinai Hospital in October 1925, at the age of 32. Nine years before, he was said to have had pulmonary tuberculosis, and a positive sputum was obtained at that time. When admitted to the hospital, he presented a large pleural effusion which was thought to be of tuberculous origin. However, examination of the aspirated fluid failed to reveal tubercle bacilli. Because of a marked retention of the dye following the Congo-red test, amyloidosis was suspected, although at this time there was no splenic or hepatic enlargement. Aspiration of the fluid was repeatedly performed. The effusion finally became purulent. On March 20, 1926, Dr. Lilienthal performed an intercostal drainage with the use of a flapper tube. The patient then ran a prolonged septic course. No tubercle bacilli were found in the sputum. Dr. Lilienthal strongly urged thoracoplasty at that time, but as the patient refused to have this done, he was discharged on June 12, 1926.

He was not seen again until November 1930, when he was readmitted to The Mount Sinai Hospital. He stated that during the interval of four and one-half years the intercostal drainage tube had remained in place and that 200 to 300 c.c. of pus drained externally every day. He noted that when lying on the right side, he coughed up material similar to that which appeared at the drainage tube. At this time he presented marked splenic and hepatic enlargement and a Congo-red test showed 90 per cent retention of the dye. Thoracoplasty was advised but again refused by the patient.

He was admitted a third time on November 19, 1934, to the service of Dr. Harold Neuhof. He stated that during the preceding four years the drainage from the intercostal tube had gradually diminished until only 75 c.c. of pus discharged daily. At times the discharge was blood-tinged.

His general health had improved remarkably and he had gained considerable weight. He volunteered the information that his spleen and liver had decreased in size.

Examination. There was slight enlargement of the liver and spleen. In the seventh left interspace posteriorly was a draining sinus containing a rubber tube. The material which escaped from this tube was foul. X-ray examination following lipiodol injection showed a large empyema cavity involving practically the entire left thorax with a bronchopleural fistula at its upper mesial aspect. It was decided that some form of thoracoplasty was indicated and that this should be done in stages.

First Operation. On November 27, 1934 an oblique incision was made in the seventh interspace encircling the sinus. A spontaneous attempt to decrease the size of the cavity was apparent from the fact that the ribs were close to each other and were rotated so that their outer surfaces faced downward. Approximately five inches of the eighth and seventh ribs were excised after the overlying musculature was divided and preserved. The parietal pleura was easily two inches in thickness and difficult to cut. It contained plaques of bone. The thoracic musculature was placed beneath the skin flaps and the latter were sewn to the cut edges of parietal pleura after the method of Keller. Microscopic examination of the excised sections of the pleura failed to reveal tuberculosis. The empyema cavity was dakinized postoperatively.

Second Operation. On December 11, 1934, segments of the sixth and fifth ribs were removed to a point about an inch beyond the lateral limits of the cavity, the intercostal muscles and the parietal pleura being excised with them. The skin flaps were sutured to the parietal pleura in order to preserve the chest musculature. The cavity was dakinized postoperatively and the patient received a transfusion at 500 c.c. of blood. The vital capacity was 1200 c.c.

Subsequent Operations. On January 4, 1935, at the suggestion of Dr. Neuhof, three inches of the left clavicle were resected subperiosteally in an attempt to further decrease the size of the cavity.

On January 18, 1935, a fourth operation was performed which consisted of excision of segments of the third and fourth ribs. Dakinization of the cavity was continued.

On February 8, 1935, in a fifth operative procedure, the skin flaps were raised and the scapula was freed from the underlying chest wall. In order to completely unroof the cavity, it was found necessary to remove segments of the first and second ribs in addition to stumps of the third and fourth ribs. Two bronchopleural fistulae, each about one-quarter of an inch in diameter, were seen on the antero-mesial aspect of the cavity near its upper extremity. A flap of muscle taken from the chest wall musculature was fashioned and split into two sections. One

was inserted into each of the fistulae for a distance of one cm. and sutured to the rim of the fistula with interrupted fine chromic stitches. The skin flaps were then sewn to the cut edges of the parietal pleura. It was noted at each of these operations that the visceral pleura was equally as thick and firm as the parietal pleura. Because of the long duration of the infection, it was felt that the underlying imprisoned pulmonary tissue had undergone extensive fibrosis and that a decortication would not be followed by inflation of the lung. Postoperative dakinization was continued.



FIG. 1. Case 1. Roentgenogram of chest following final operation, showing the layer of air between the visceral pleura and the overlying thoracic musculature.

The muscle flaps healed by primary union. Somewhat later two small slit-like fistulae were noted below the site of the former fistulae. These were treated with applications of 35 per cent silver nitrate without any demonstrable effect. Repeated cultures of the surface of the visceral pleura were made. The final culture showed diphtheroids.

On March 29, 1935, the wound was considered clean enough for closure. By this time the enormous cavity was completely unroofed, the visceral pleura was covered with healthy granulation tissue, and discharge was minimal. At the final operation the skin flaps which had been preserved

at each previous operation were extensively mobilized. The underlying musculature was freed on each side. Small segments of the second and third ribs were excised. The two small remaining bronchial fistulae were closed by insertion of pedicled muscle flaps fashioned from the subscapularis muscle. The large defect in the chest was then repaired by bringing the thoracic musculature together with interrupted sutures. A Carrel tube was placed deep to the muscles and one beneath the skin flaps which were closed with interrupted stitches of silkworm gut. A firm pressure dressing was applied. The tubes were gradually shortened and removed



FIG. 2. Case 1. Roentgenogram of chest taken nine months after the last operation, showing complete absorption of the layer of air noted in Figure 1. The absence of any marked scoliosis is noteworthy.

at the end of the tenth day. The wound healed by primary union. The patient was discharged from the hospital on April 19, 1935.

Four weeks later he returned to the Follow-up Clinic with a bulge in the lower half of the incision. A probe inserted at the lower angle evacuated a large quantity of bloody fluid which had apparently accumulated in the dead space between the muscles and the visceral pleura. A drain was inserted and the patient was referred to the Out-Patient Department for dressings. The wound continued to drain serosanguineous material until the end of August 1935. Since then the wound has remained healed.

The patient has gained considerable weight. There is no cough or expectoration. Examination at the present time shows the deformity which follows such an extensive procedure. The resulting scoliosis is negligible. There is some impairment of motion in the shoulder as a result of the clavicular resection. X-ray examination of the chest at the present time (Fig. 2) shows practically complete collapse of the left chest and absorption of the layer of air which had been noted by X-ray following the last operation (Fig. 1).

COMMENT

The facts in the clinical history seem to indicate that the case is one of non-tuberculous chronic empyema, caused at first by pleuropulmonary suppuration and maintained by bronchopleural fistulae. The decision to obliterate the enormous cavity by bringing the chest wall to the imprisoned lung rather than by bringing the lung to the chest wall by decortication was based on the finding of greatly thickened and resistant parietal and visceral pleura and the probable parenchymal fibrosis of the lung because of the long duration of the disease.

The procedure utilized in this case entailed a graded operation with preservation of the thoracic musculature for later plastic repair. Diverticula and recesses of the main cavity were easily visualized and unroofed. Surprisingly enough, the resultant scoliosis is minimal.

Case 2 (Adm. 381672). This patient was first admitted to this hospital in August 1926, at the age of $5\frac{1}{2}$ years, with a post-tonsillectomy abscess in the upper lobe of the left lung of three weeks' duration. He was treated medically at that time by postural drainage and bronchoscopic lavages. He was discharged from the hospital considerably improved at the end of September 1926.

He was readmitted in June 1927 with a recurrence of all the symptoms. There were fever, loss of weight, persistent cough, and expectoration of large amounts of foul sputum. On June 24, 1927, he was operated upon by Dr. Ira Cohen, at which time sections of the left third, fourth, and fifth ribs were removed extrapleurally, as a first stage for subsequent drainage of the lung abscess. On July 27, 1927, the second stage was done by Dr. Cohen. The anterior segment of the third rib was removed and the lung aspirated in the midclavicular line at this point. Foul pus was obtained. An opening was then made into the abscess cavity which measured approximately two inches in diameter.

After a prolonged convalescence he was finally discharged with a tube in the operative wound. This was inserted to maintain the bronchostomy. He was seen from time to time in the Follow-up Clinic until December 1929, when following a lipiodol injection through the sinus, bronchiectatic dilatations of the neighboring bronchi were demonstrated.

From 1929 to 1933 there were numerous flare-ups of the pulmonary infection. Each one subsided spontaneously. About a year ago the bronchostomy tube was removed, but the fistula failed to heal.

The patient was finally admitted on July 1, 1935 for closure of the fistula. The patient felt well; he coughed occasionally, and expectorated only a small amount of odorless sputum. During the preceding three or four years, there had been no hemoptysis or bleeding from the fistula. Prior to operation, a careful study which included bronchoscopy and bronchograms, failed to reveal any residual pulmonary infection, and it was considered safe to attempt closure of the fistula. The fistulous open-

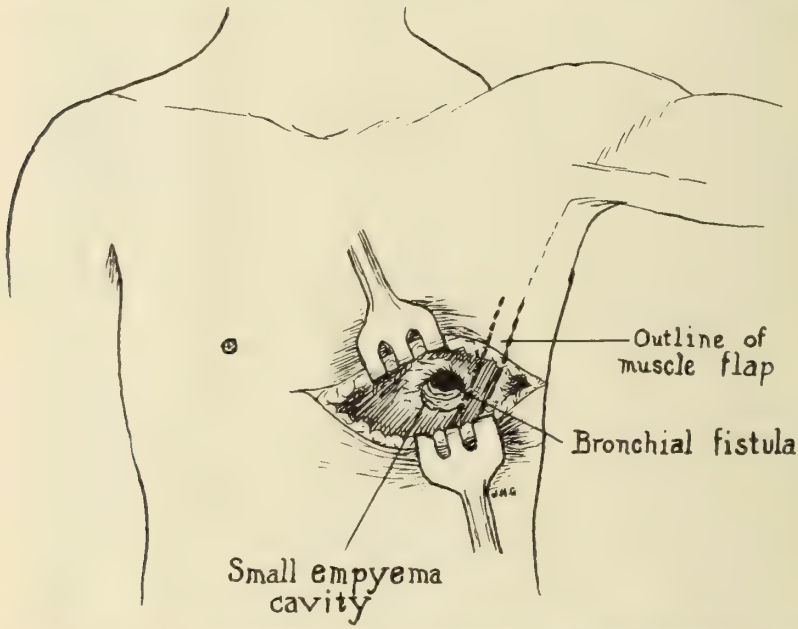


FIG. 3. Case 2. Diagrammatic sketch of operative findings, showing the small empyema cavity and the large bronchial fistula. The muscle flap was taken from the lower edge of the pectoralis major.

ing was noted in the third left interspace in approximately the midclavicular line and communicated directly with a bronchus. It measured about 1.5 cm. in diameter.

Operation. On July 16, 1935 the patient was operated upon for closure of the fistula. An incision was made encircling the fistulous opening (Fig. 3). It was found that the ribs had reformed in such a way as to form an encircling plaque of bone. This was not disturbed. The skin was continuous with a small extrapulmonary cavity measuring 2 cm. in diameter. The edge of the pectoralis major muscle was isolated and a pedicled muscle flap with its base downward was fashioned. The flap

was turned upon itself and inserted into the bronchial fistula for a distance of 2 cm. (Fig. 4). It was anchored by interrupted sutures of fine chromic catgut between the mouth of the fistula and the muscle flap. The remainder of the muscle flap was sutured to the surrounding tissues. A small drainage tube was placed beneath the flap and another superficial to it, and the wound closed in layers.

Convalescence was uninterrupted. The patient's cough disappeared after the third day. The drainage tubes were removed on the third postoperative day. The wound healed by primary union. Since that time

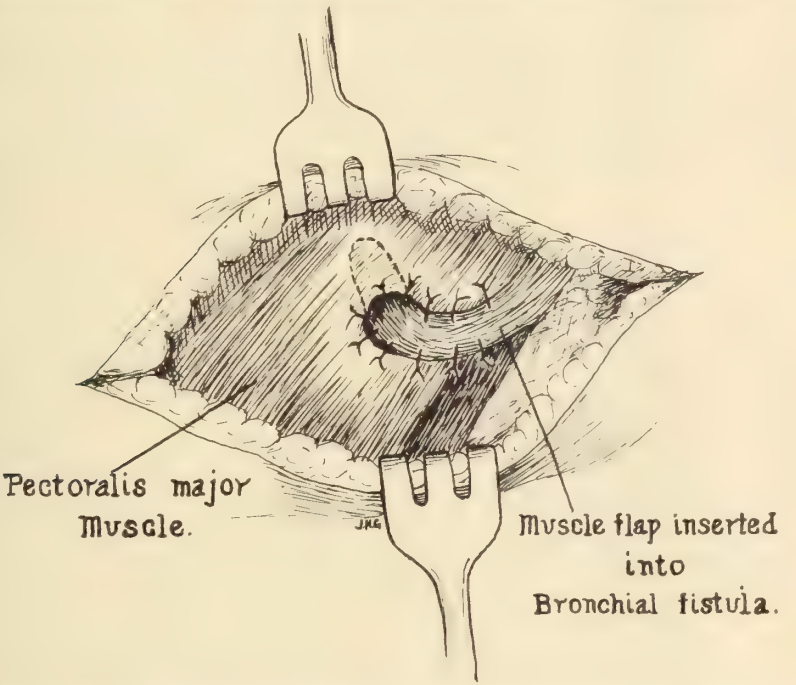


FIG. 4. Case 2. Diagrammatic sketch of the operative procedure, showing the muscle flap turned into the bronchial fistula as one inserts a cork into the neck of a bottle. The edges of the flap are shown anchored by sutures to the surrounding structures.

the patient has remained well and has gained weight. There have been no symptoms referable to his old pulmonary infection.

COMMENT

The above cases are presented to call attention again to a valuable and simple method of closing persistent bronchial fistulae. There is no question about its use in the treatment of bronchopleural fistulae associated with chronic empyema. The operation should not be performed for the closure of a fistula associated with lung suppuration until it is

determined that the underlying infection no longer exists and that the presence of a bronchial opening as a means of aeration of the lung has outlived its usefulness. This is exemplified by the second case.

When Pool and I reported this surgical procedure in 1929, a careful survey of the literature made prior to the publication led us to believe that the method was original. However, about two months ago, I found a description of a similar procedure reported by Abrashanoff in a two-paragraph article in the Zentralblatt für Chirurgie for 1911. He described the use of a pedicled muscle flap inserted into a persistent bronchial fistula in practically the same way as Pool and I have done. Pedicled muscle flaps have been used in the treatment of bronchial fistulae for many years, notably by Eggers and Keller. The reports of these men definitely state that the flaps were placed over the bronchial opening and not into the fistula as one inserts a cork into a bottle. I believe that the principle is different and that the processes of repair in the latter method are such that success of closure of the fistula is more certain.

ACUTE INFECTIOUS MONONUCLEOSIS WITH UNIDENTIFIED STRUCTURES IN THE SUPRAVITAL PREPARATIONS OF THE LYMPH NODES[1]

LOWELL A. ERF, M.D.

[*From the Medical Service of Dr. B. S. Oppenheimer and the Division of Laboratories*]

The purpose of this report is to describe peculiar bodies found in fresh lymph node scrapings. These bodies were observed in three cases of acute infectious mononucleosis. Supravital preparations of both normal and abnormal lymph nodes served as controls.

CASE REPORT

History (Adm. 376361). The patient was a 12 year old Jewish girl, born in, and never out of the environs of New York City. She was unaware of being in contact with visitors of the tropics, with imported pets, or of having been exposed to any illness. Aside from having had some of the diseases of childhood, she had been well until her recent illness. She entered the hospital on February 4, 1935, complaining only of fever and tiredness. Three days before admission the patient complained of nausea and drowsiness. The next day she developed a boring pain around the umbilicus, intensified on deep inspiration or when walking. The following morning the patient developed a headache and her temperature rose to 105°F. There were no chills, loss of consciousness, ocular disturbances or diarrhea. On the day of admission to the hospital the pain in the abdomen subsided.

Physical Examination. The patient appeared to be a thin but normally developed girl lying comfortably in bed, appearing remarkably well despite a temperature of 106°F. There was a slight pharyngitis, and a few pea-sized bilateral axillary and posterior cervical nodes were palpable. Diffusely scattered over the chest, abdomen and right arm were light-topped, tender papules with an erythematous halo which disappeared on pressure. The blood pressure was 115 systolic and 65 diastolic.

Laboratory Data. The blood Wassermann test, the von Pirquet, Mantoux, and the agglutination reactions for typhoid, paratyphoid, typhus, and Malta fever were negative. Aerobic and anaerobic blood cultures were also negative. The urine examinations were negative. Roentgenograms of the chest and abdomen revealed no pathologic changes. The blood count was as follows: hemoglobin, 75 per cent; white blood

[1] Presented at the Clinical Conference, March 22, 1935.

cells, 3,850; non-segmented polymorphonuclears, 25 per cent; segmented polymorphonuclears, 35 per cent; eosinophiles, 1 per cent; basophiles, 1 per cent; lymphocytes, 27 per cent; monocytes, 11 per cent. The leucopenia and polynucleosis with many non-segmented forms are not unusual findings in the early stages of infectious mononucleosis.

Course. On the *second day*, the rash extended to the back and shoulders. There was a definite enlargement of all the peripheral lymph nodes. The spleen became distinctly palpable. The patient remained comfortable and non-toxic with the temperature remaining at 105°F. On the *third day* the patient became toxic and drowsy. There developed slightly positive bilateral Kernig signs, and a spinal tap was done which revealed cerebrospinal fluid normal in all phases. Because of questionable râles, the chest was X-rayed, and at this time a beginning bronchopneumonia in the upper half of the left lower lobe was noted. A blood count now showed: white blood cells, 7,600 with 82 per cent polymorphonuclears, 16 per cent lymphocytes, and 2 per cent monocytes. On the *fourth day* the rash became brownish and extended to the face. The patient became more irritable and the bronchopneumonia extended to include all of the left lower lobe. Blood cultures, Weil-Felix, heterophile antibody and agglutination reactions for typhoid, paratyphoid and militensis were all negative. The blood urea was 24 mg., blood chlorides 280, and blood sugar 90 mg. The white cell count was 9,600 with non-segmented polymorphonuclears 16 per cent, segmented polymorphonuclears 54 per cent, basophiles 1 per cent, lymphocytes 26 per cent, and monocytes 3 per cent. On the *ninth day* the rash began to disappear. The spleen was palpable three fingers below the costal margin, the liver four fingers, and all of the peripheral lymph nodes were markedly enlarged. The patient, having run a constant temperature varying between 103°F. and 105°F. for nine days, was now very toxic, irritable, and irrational, showing marked pallor, dyspnea and cyanosis. The bronchopneumonia now included part of the right lower lobe. Another blood count showed the following: hemoglobin 69 per cent; red blood cells 2,850,000; white blood cells 10,200; non-segmented polymorphonuclears 22 per cent; segmented polymorphonuclears 52 per cent; lymphocytes 25 per cent; monocytes 1 per cent. Oxygen therapy was administered, resulting in remarkable improvement.

Acute Hodgkin's disease, acute aleukemic leukemia, miliary tuberculosis, and septicemia were considered as diagnostic possibilities. A left inguinal lymph node was biopsied and reported as showing "hyperplasia of vacuolated endothelium." Immediately after removal of the lymph node, a supravital scraping preparation was made; it will be described later. On the *tenth day* a typical blood picture of infectious mononucleosis developed with the white count 8,500 and the differential revealing 50 per cent polymorphonuclears, 30 per cent small lymphocytes, 15 per cent

large lymphoid cells, 4 per cent monocytes, and 1 per cent basophiles. The large lymphoid cells were the abnormal forms which are usually found in infectious mononucleosis. The supravital preparations disclosed these large lymphoid cells to contain huge mitochondria.

On the *twelfth day* of her illness a right inguinal lymph node biopsy was done. The pathological changes of this node were the same as found in the first. The supravital findings of this second node will be described in greater detail later. The heterophile antibody reaction was repeated and found to be negative.

During the next *two weeks* the patient received repeated oxygen therapy, transfusions, and intravenous Fuadin. The rash faded; the bronchopneumonia receded, and the temperature gradually dropped by lysis. During this period the typical blood picture of infectious mononucleosis persisted.

On the *forty-second day* the patient was quite cheerful and took nourishment well. A blood count showed: hemoglobin 90 per cent; red blood cells 4,600,000; white blood cells 17,600; non-segmented polymorphonuclears 5 per cent; segmented polymorphonuclears 26 per cent; eosinophiles 5 per cent; basophiles 2 per cent; lymphocytes 52 per cent; monocytes 10 per cent. The temperature was still somewhat elevated, ranging between 99° and 100°F., but finally returned to normal. The patient continued to improve and left the hospital. She was seen in the Follow-up Clinic three and eight months later. On both occasions she felt well and had no complaints. The temperature and blood counts were normal. She had gained some weight but was apparently very slow to recover her former level. She still presented hard, shotty, generalized lymph nodes.

SUPRAVITAL STUDIES OF FRESH LYMPH NODE SCRAPINGS

The scrapings of the inguinal lymph nodes, removed at the first biopsy, examined with supravital methods, revealed peculiar bodies (see accompanying figure). There were one to seven of these bodies per oil immersion field. The presence of these bodies was verified by a study of scrapings from lymph nodes of the second biopsy, although they were fewer in number. The peculiar bodies were apparently small transparent sacs, spheres, or cysts (about the size of a red cell) which contained a clear, light yellow-colored fluid with actively motile, brownish-black granules. The granules were comma-shaped, L-shaped, or irregularly shaped, and numbered ten to fifteen to each cyst. Their activity was similar to that seen in the gametocyte stage of the malarial organism. The gametes, after disintegrating the hemoglobin of the red cell, become very active, rupture the cell wall and escape. This same activity was seen in these unknown granules. The activity, at first, was thought to be Brownian movement. In an oil immersion field, degenerating polymorphonuclear

cells with their granules in Brownian movement could be compared with the cysts and their granules. This comparison convincingly indicated that the cyst granules had their own individual motion. The cysts maintained their integrity for a considerable length of time. They could be distinguished as yellowish bodies for as long as four weeks, long after the lymphocytes and reticulum cells of the lymph node had disintegrated. The granules of many of the cysts remained active for two days and some maintained activity for five days.

These preparations were submitted for study to prominent pathologists, bacteriologists and parasitologists. They were all unable to identify these bodies.

Efforts to stain these bodies in paraffin-imbedded material failed be-

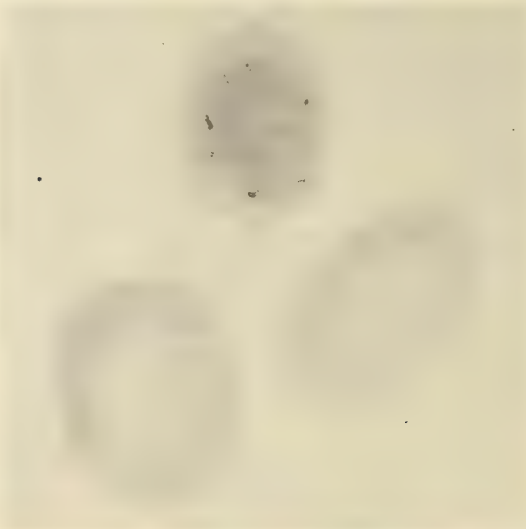


FIG. 1. The appearance of the unknown body as compared with that of red blood cells. The latter are the two lower figures.

cause it was soon learned that they were alcohol soluble. This was determined by running alcohol under the slide while these bodies were in focus under the microscope.

Experimental Data. Emulsions of the node were cultured aerobically and anaerobically on various media. However, the cultures remained free of growth.

Two guinea-pigs injected intraperitoneally with the lymph node emulsion gave negative pathological and bacteriological findings, after four weeks had elapsed. One rabbit injected intravenously gave negative findings. Another rabbit injected intracerebrally, intradermally, intraocularly and intratesticularly died the next day without positive post mortem findings. Two mice were injected intraperitoneally. One

mouse died sixty hours later and had a small liver abscess filled with yeast cells in active budding. It was the general opinion that this had no relationship to the unknown cyst. The other mouse revealed nothing at autopsy six weeks later.

During the early course of the patient's disease, there was noted a marked increase in blood dust. On closer supravital and dark field examination, some of the structures appeared to be similar to the granules of the cysts. Controls of normal and septic bloods showed none of these structures. With this in mind, twenty cubic centimeters of the patient's blood were injected intravenously into a monkey by Dr. P. Vogel. Two weeks later, the left axillary node began to enlarge and was removed. The node, 2.5 cm. in diameter, contained a tuberculous abscess, but a supravital scraping of the node revealed the same peculiar cysts as were seen in the lymph nodes of the patient. Four weeks later, another lymph node biopsy was done, but no cysts were found. Eight weeks later a splenectomy was done. The spleen had many tubercles but no cysts were seen.

The first lymph node removed from the monkey was emulsified and given to two rabbits intravenously, to two rats and two mice intraperitoneally and intravenously to another monkey. These animals failed to show the typical cysts seen in the patient.

Comment. These same cysts with active granules were observed in two other cases (Adm. 386882, 379734) of acute infectious mononucleosis. One of the cases had a positive heterophile antibody reaction in dilutions up to 1:256. Since the heterophile antibody reaction is positive in only 40 per cent of infectious mononucleosis cases, the diagnosis must rest on the clinical and hematological data. Both of these cases had the typical clinical course and the typical blood findings of infectious mononucleosis. The unknown cyst-like bodies described here were not found in the lymph nodes of five other cases of typical infectious mononucleosis, a fact which would suggest the possibility that they appear only during certain stages of the disease.

It is hoped that this experience might stimulate further research in attempting to identify these structures, since further study is necessary to establish the true character of these bodies and to exclude a remote probability of their being artefacts.

TWO PULMONARY ABSCESSES IN A PATIENT, WITH A FOURTEEN YEAR INTERVAL

LEO STERN, D.D.S.

[*Surgical Service of Dr. Harold Neuhof*]

Considerable circumstantial evidence, accumulated in studying the large number of pulmonary abscesses treated at The Mount Sinai Hospital, indicates unquestionably that putrid abscess of the lung is initiated in nearly every case by inhalation of infective particulate material into the tracheobronchial tree. It is obvious that the source from which this material can gain entrance to the bronchi is limited to the nasal passages, the pharynx and the oral cavity.

Although many abscesses of the lung occur postoperatively or in definite relationship to an obvious oral source, a great proportion of the cases defy etiologic classification (1). By reason of the fact that few belonging to the group of indeterminate etiology give evidence or history of nasal or pharyngeal infection, the conclusion is inevitable that the infected particles producing abscess of the lung must originate elsewhere in the mouth, more especially from the region of the teeth. This conclusion gains weight in the finding that tartar encrusted teeth associated with infected gums have been found in the mouths of over 80 per cent of the group of cases of indeterminate etiology at this hospital (2). It is believed that in these cases accidentally dislodged fragments of dental tartar, bearing the anaerobes accompanying gingival suppuration, are aspirated, probably during sleep.

This theory is strongly supported by this case report in which a patient suffered two abscesses of the lung. The original abscess was definitely cured; the second occurred in the opposite lung after an interval of fourteen years. The only available source for the aspiration of septic particulate material in both instances was from about the teeth. The latter presented heavy deposits of friable, infected tartar.

CASE HISTORY

J. M., (Adm. 371988), a man 42 years of age, was readmitted to the hospital on October 10, 1935. In August 1924 a putrid abscess of the lung situated in the *right upper lobe* had been treated by pneumonotomy and drainage by Dr. Neuhof. At that time the infection was of three years' standing. No etiologic factor could be elicited either at another hospital where he first applied for treatment (1921) or here. The patient was advised to give up his occupation, that of a metal worker, because of its

possible relationship to the pulmonary infection. The dental report described the presence of discolored teeth, heavy tartar deposits, and severely inflamed gums. Complete recovery followed the operation and the patient had been entirely symptom-free for many years. X-ray examination also demonstrated the disappearance of all pulmonary infiltration.

The present illness began three and one-half weeks before admission. At first there was a mild cough and expectoration. Several days after the onset there occurred a severe chill followed by a temperature of 104°F. Soon after, expectoration of foul sputum began. During the following two weeks pain was experienced in the left lower chest anteriorly; a hemoptysis occurred, and the fever, cough and expectoration continued for periods of two to three days, separated by remissions lasting one day. It is interesting to note that the patient had abandoned his former trade and was now a tile-setter.

The impression formed was that of acute putrid abscess of the lung in the *left lower lobe.* This was confirmed by bronchoscopy, X-ray examination and operation, which consisted of a pneumonotomy and drainage performed by Dr. Neuhof.

The mouth was markedly unhygienic. There were heavy, flaky deposits of tartar about the teeth, particularly on the lingual side of the lower anteriors. The gingival margins of the gums were congested and suppurating. A leukoplakia patch presented on the right cheek. The patient gave a history of episodes of "sore mouth with profuse bleeding of the gums," recurring at approximately six month intervals for over twenty years. The last episode of this type occurred three months ago at which time the maxillary right first molar was removed under local anesthesia.

COMMENT AND CONCLUSIONS

This case presents an interesting problem from the standpoint of pathogenesis. The patient suffered two separate abscesses of the lung, one located in the right upper lobe, the second in the left lower lobe. The original abscess completely resolved after operation; the interval between its onset and the second abscess was fourteen years.

No etiologic factor could be elicited for the production of either abscess. It is logical to assume that the same cause operated in both instances. Aspiration of septic particulate material (3) is the accepted etiologic factor in most putrid abscesses of the lung, according to the views formulated by the chest group at The Mount Sinai Hospital. It is well known that aspiration occurs readily from the mouth and that in neglected unhygienic mouths there is ample suitable material which, if inhaled, may cause pulmonary abscess. In searching for a common factor which could have operated as the source of both abscesses in the reported case, the only one

that can qualify is the heavy deposit of infected tartar about the teeth. It is presumed that in this case some of the small fragments of tartar that were dislodged from the teeth from time to time were aspirated and on two widely separated occasions resulted in an abscess of the lung.

REFERENCES

(1) Touroff, A. S. W., and Moolten, S. E.: The Symptomatology of Putrid Abscess of the Lung. J. Thoracic Surg., 4: 558, 1935.

(2) Stern, L.: Etiologic Factors in the Pathogenesis of Putrid Abscess of the Lung. To be published.

(3) Neuhof, H., and Wessler, H.: Putrid Lung Abscess: Its Etiology, Pathology, Clinical Manifestations, Diagnosis, and Treatment. J. Thoracic Surg., 1: 637, 1932.

OTITIC SEPSIS OR ACUTE BACTERIAL ENDOCARDITIS?

A Preliminary Report

HARRY ROSENWASSER, M.D.

[*Otological Service of Dr. Isidore Friesner*]

As a rule the diagnosis of lateral sinus thrombosis is not particularly difficult. Occasionally, however, following middle ear suppuration, evidences of sepsis appear coincidentally with a cardiac lesion. In such instances the otologist is often in a quandary as to whether he is dealing with an otitic sepsis or an acute bacterial endocarditis. This case is presented because it demonstrates some of the criteria which we found helpful in establishing the correct diagnosis.

CASE REPORT

History (Adm. 287560). The patient, a 40 year old woman, was admitted to the Otological Service fourteen days after she experienced a sense of pain in the left ear accompanied by a thin watery discharge. Twelve days later there was severe pain in the left ear, and eight hours later she had a shaking chill which lasted one hour and was followed by fever, headache, dizziness, nausea, and vomiting. The pain and headache continued. She vomited several times and had constant buzzing and impaired hearing in the left ear. The patient was a known diabetic and had had rheumatic fever.

Examination. The right drum was retracted; all its landmarks were visible. The hearing was normal. The left drum was full posteriorly and a pulsating discharge, scant in amount, came from a perforation in the tubal region. The mastoid was tender. There was a spontaneous nystagmus directed horizontally to the right, but no spontaneous past-pointing. Total deafness (noise apparatus used) was found in that ear. There was a systolic murmur over the cardiac apex. The spleen was palpable. The fundi oculi were normal at this time. Over the left deltoid region there was an erythematous eruption, but no petechiae were noted. The hemoglobin was 80 per cent.

Course. The labyrinthine symptoms gradually subsided. On the fourth day in the hospital the patient had a chill and the temperature rose suddenly to 105°F. The impression of the medical consultant was that these manifestations were probably due to an otitic sepsis and that the apical murmur was coincidental. The otologists, however, felt that the erythematous lesions which had appeared over the back, arms, and body were

not erysipelatous but embolic. The following day the physical characteristics of the cardiac murmur had definitely changed. The murmur was now audible over the entire precordium. Furthermore, for the first time, a small hemorrhagic lesion was observed in the conjunctiva. At this time, the internists felt that acute endocarditis could not be excluded. The last blood culture taken was reported positive, there being 18 colonies of Streptococcus hemolyticus per cu. mm. of blood.

While under observation, the patient developed redness and swelling over the mastoid bone. Erythematous areas suggestive of Janeway lesions appeared over the dorsal and plantar surfaces of the right foot. These rapidly faded. The external malleolus became tender. White centered petechiae were noted in the conjunctivae of both eyes. Repeated blood cultures remained positive. Blood, obtained by the Ottenberg procedure, revealed on culture 10 and 11 colonies per cu. mm. of blood from each internal jugular vein with a corresponding number of colonies in the peripheral circulation. The general condition of the patient was so poor that operation was not considered. A panophthalmitis developed, and generalized white centered petechiae appeared. Hemolytic streptococci were found in the spinal fluid on smear and in culture, and the patient died twenty-four hours thereafter.

Post Mortem Findings. The endocardium of the mitral valve was thickened and on its auricular border there were fresh, friable, brownish vegetations which almost encircled the valve at its line of closure. The other valves were uninvolved. There was a purulent mastoiditis, abscesses in the kidneys, bilateral focal glomerulonephritis, acute splenic tumor and multiple cutaneous petechiae. *The lateral sinus was not diseased.*

Histologic examination of the valve revealed necrotic areas; the surface of the valve was covered with necrotic polymorphonuclear leucocytes and masses of bacteria. Some of the bacteria were observed in the deeper substance of the valve. The mastoid bone and petrous pyramid were obtained and study of the sections revealed evidence of meningitis with pus in the internal auditory meatus, pus throughout the labyrinth, granulations and pus eroding into the facial canal, erosion of the promontory and annulus. The middle ear was full of pus. There was extensive disease of the petrous pyramid, especially the perilabyrinthine cells. The lateral sinus and jugular bulb, however, were normal.

COMMENT

The result of the Ottenberg differential blood culture, which revealed an almost identical number of colonies of bacteria in the circulating blood taken simultaneously from the right and left internal jugular veins and arm vein, was indicative of an endocarditis. Ottenberg has demonstrated that in sinus thrombosis, whether there be an occluding or a mural throm-

bus, there is *always* found a greater number of bacteria in the internal jugular veins than in the peripheral circulation at that same instant.

Another important diagnostic finding was the clinical recognition of the changing character of the heart murmur from day to day. In this case the murmurs changed in location, time in the cardiac cycle, and in quality, leaving little doubt that some acute endocardial lesion was the cause.

The significance of petechiae in the differential diagnosis should be emphasized because these cutaneous white-centered embolic lesions have never been observed by us in any uncomplicated case of lateral sinus thrombosis.

It is very uncommon in acute endocarditis to note any change in the fundi other than embolic lesions or their manifestations. The panophthalmitis which occurred in this case was a manifestation of the endocarditis.

The history that this patient had had rheumatic fever was of some importance because of the known tendency for previously damaged heart valves to become the site of an acute endocarditis.

CONCLUSION

A correct differential diagnosis is essential, since lateral sinus thrombosis is amenable to surgery, whereas the presence of an acute bacterial endocarditis contra-indicates surgical intervention because of the hopeless prognosis.

REFERENCES

Ottenberg, R.: The Diagnosis of Sinus Thrombosis. Arch. Otolaryng., 5: 43, 1927.
Ottenberg, R.: Differential Blood Cultures. J.A.M.A., 94: 1896, 1930.

OVARIAN CARCINOMA WITH ASCITES IN RELATIVELY YOUNG WOMEN

EMANUEL KLEMPNER, M.D.

[*Gynecological Service of Dr. Robert T. Frank*]

The following five cases are presented as a group because they show fundamentally the same clinical picture and also because of the relatively young age of the patients.

CASE REPORTS

Case 1 (Adm. 385820). A 22 year old woman was admitted to the Gynecological Service on October 21, 1935, complaining of lower abdominal pain associated with nausea, vomiting, and fever of six weeks' duration. During that time she had noted progressive enlargement of the abdomen. Examination at the time of admission revealed a cystic mass filling the right pelvis to the level of the umbilicus. Because of a suppurative suprapubic folliculitis, operation was postponed. During the subsequent five days it became apparent that fluid was accumulating in the abdomen. Laparotomy was then performed (October 27, 1935). About 9,000 c.c. of free fluid was evacuated from the abdomen and a muskmelon-sized right ovarian cyst was found and removed (Fig. 1). The report of the pathologist read: "pseudomucinous papillary cystadenocarcinoma of the ovary." The ascitic fluid was likewise reported to contain carcinoma cells but it may have contained some of the cyst contents, and the report can not be accepted as indicative of the presence of carcinoma cells in the free peritoneal cavity. The patient has been receiving radiotherapy and appeared well when last seen (January 15, 1936).

Case 2 (Adm. 387648). The patient was a 31 year old woman who entered the hospital on December 10, 1935, complaining of a loss of thirty-five pounds in weight and enlargement of the abdomen in the course of five months preceding her admission. Abdominal paracentesis had been done six weeks before admission and reliable studies of the ascitic fluid revealed neither tumor cells nor tubercle bacilli. She finally consented to enter the hospital and examination at that time showed the abdomen to be distended by fluid and disclosed a firm, nodular resistance behind the cervix. At laparotomy (December 11, 1935) 9,500 c.c. of brownish fluid were removed. A papillary growth, the size of a grapefruit, was found arising from the right ovary (Fig. 2). The liver, omentum, and

peritoneal surfaces were found free of any evidence of carcinoma. Supravaginal hysterectomy and bilateral salpingo-oophorectomy were performed. A retroperitoneal nodule removed from the left pelvic wall was reported: "organized hemorrhage; no evidence of neoplasm." The ovary

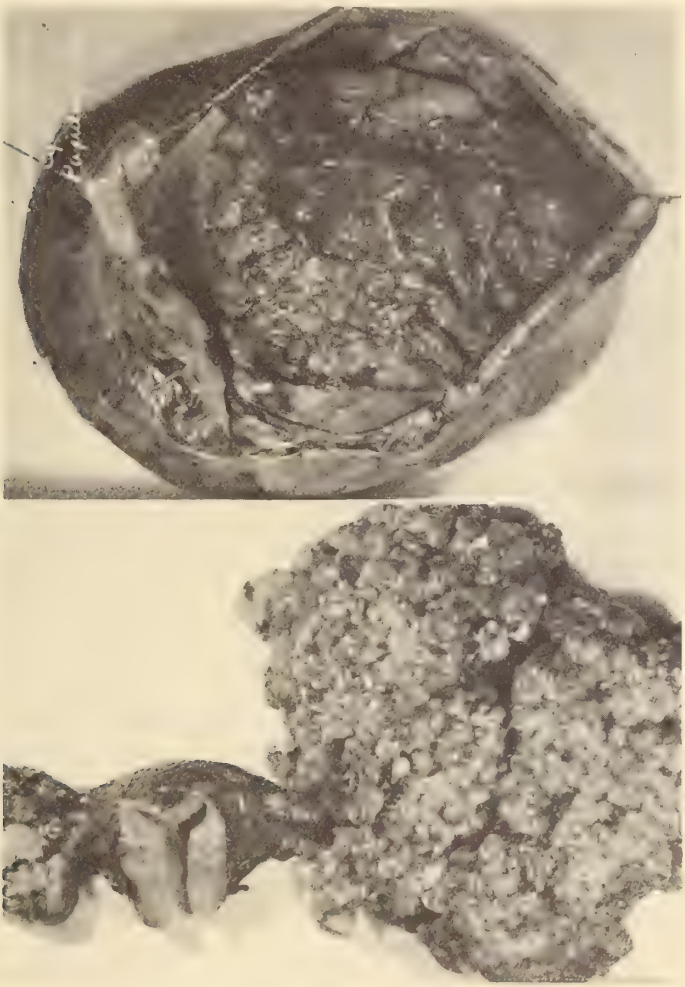


FIG. 1. Case 1. Pseudomucinous papillary cystadenocarcinoma of ovary
FIG. 2. Case 2. Papillary adenocarcinoma of ovary

was reported "papillary carcinoma." This patient also has been referred for radiotherapy.

Case 3 (Adm. 388404). The patient, aged 39 years, entered the hospital on January 2, 1936, complaining of nausea, eructations, constipation, and

pain in the left lower quadrant for two months preceding her admission. She was very obese and her abdomen was distended with fluid. Huge bilateral pelvic masses reaching above the level of the umbilicus were readily made out. Barium enema was reported by the X-ray department as showing "a constant narrowing, two and a half inches long, in the lower descending colon. The appearance on fluoroscopy and X-ray was suggestive of a neoplasm." Because of the bilateral pelvic masses, a primary ovarian growth infiltrating the wall of the bowel was considered as the most probable lesion. Despite the patient's poor general condition it was decided to explore the abdomen in the hope that the tumor might prove operable. This was done on January 4, 1936 under local anesthesia, which was entirely satisfactory. Eight thousand c.c. of ascitic fluid were removed and then huge bilateral ovarian carcinomata, partly solid and partly cystic, were visualized. The peritoneal wall and omentum were studded with metastases. Evacuation of the cysts and biopsy seemed valueless, and in view of the patient's grave prognosis, a colostomy was thought inadvisable. The abdomen was closed without any further procedure. At the time of discharge (January 20, 1936), there was evidence of re-accumulation of fluid in the abdomen.

Case 4 (Adm. 387540). This woman, aged 40 years, entered the hospital on December 3, 1935. She had had a posterior colporrhaphy performed at another hospital two months before admission to the Medical Service of The Mount Sinai Hospital. She complained of para-umbilical pain and enlargement of the abdomen of two weeks' duration. Paracentesis abdominis was performed, and 5,000 c.c. of clear fluid were evacuated. Vague pelvic masses could then be felt through an obese abdominal wall. The patient's general condition was very poor and the outlook appeared hopeless, but in keeping with the observation that a few of such apparently fatal cases present operable lesions, laparotomy was performed on December 7, 1935 under local anesthesia. Seven thousand and five hundred c.c. of fluid were evacuated, and a huge pelvic mass whose surface was studded with carcinomatous deposits was found filling the entire lower abdomen. The omentum was likewise the seat of malignant invasion. It was obvious that nothing could be done, and the abdomen was therefore closed. A private physician has since reported that fluid is re-accumulating in the abdomen and the patient is going downhill.

Case 5 (Adm. 387408). This patient was a 42 year old woman who three years previously had had a supravaginal hysterectomy for fibroids at another institution. The ovaries were reported to be negative. During the year preceding her admission to The Mount Sinai Hospital, she had been seen at the Out-Patient Department of another hospital, where

her anorexia and postprandial distress were attributed to "indigestion." In the two months preceding admission she became aware of progressive enlargement of the abdomen accompanied by weakness and pain in the right upper quadrant. On admission to this hospital (December 6, 1935), the abdomen was found distended by fluid. A pelvic examination disclosed behind the cervix a hard, irregular mass "reaching from one pelvic wall to the other." Exploratory laparotomy was performed on December 8, 1935 and 11,000 c.c. of ascitic fluid were removed. The peritoneal surface was found studded with carcinomatous implants. The omentum was a matted mass of carcinomatous tissue. The liver was similarly involved. The pelvis was filled with a solid mass of malignant tissue. An omental biopsy was done and the abdomen was closed. The report of the pathologist read: "papillary adenocarcinoma." Four weeks later the patient required abdominal paracentesis because of re-accumulation of ascites.

SUMMARY

In three of the five cases described above, the duration of symptoms was exceedingly short when compared with the extent of the disease found at operation in this young age group of women. In one case the malignancy had invaded the bowel. In the fourth case the symptoms were of five months' duration, but the patient refused investigation until the abdomen was markedly distended by fluid. The fifth case reveals a sad situation; the patient, with abdominal symptoms, was treated for "indigestion" for one year without either a rectal or vaginal examination having been done. She finally reached the hospital with hopelessly advanced disease. These cases indicate the urgent need for early and thorough investigation and treatment of ovarian neoplasms.

Local anesthesia has been found entirely satisfactory in patients who are poor surgical risks, supplementary anesthesia being necessary only when radical removal is undertaken.

ESSENTIAL POINTS IN THE DIAGNOSIS OF SOME PARASITIC DISEASES

PEDRO N. ORTIZ, M.D.

[*From the Hematological Clinic of the Out-Patient Department*]

INTRODUCTION

In a cosmopolitan city like New York where there is a steady influx of people from all parts of the world, hospitals and dispensaries, as well as the private physician, must be prepared to deal with parasitic diseases of varied geographic etiology. The latter, determined by previous residence of the affected individual in known endemic regions, exposure to infection or infestation over more or less prolonged periods of time, and by the longevity of the parasites concerned, are the three main points to be considered. Occasionally, a patient may have a hard hyperplastic edema of one extremity and a secondary lymphangitis, signs highly suggestive of *filariasis*. At times the geographical etiology, as expressed by the previous residence of such a patient, may supply the only clue to a correct diagnosis. Also, the knowledge of the hereditary nature of the disease may lead to the suspicion and the discovery of *Milroy's disease* as in the case of three members of the same family, who have all been born in New York City and at no time have visited any known endemic region. On similar grounds, *filariasis* and *schistosomiasis mansoni* have been suspected and subsequently found in two patients after periods of over twenty years outside their native country. At times, in cases of *strongyloides intestinalis* and *oxyuris vermicularis*, infestation may persist indefinitely with remarkable intensity for years, not due to the longevity of the parasites which, having developed in the rectum, penetrated the anal folds as larvae, but to the unconscious and continuous transference of eggs from the anus and perineal region to the mouth of the host. *Bothriocephalus latus* infestation may occasionally give rise to highly atypical symptoms. It was found to be responsible, in one instance, for an apparent anxiety neurosis and in another case, for a form of neurosis characterized by bulimia. The diagnosis was made by the discovery of large numbers of operculated eggs in the feces. The removal of the worm in both of these cases terminated the neurosis.

Laboratory Diagnosis. Examination of the stool for parasites is being carried out almost everywhere in a most unsatisfactory way, due perhaps to the lack of interest with which physicians view this important branch of general medicine. The usual cover-slip preparation, a smear spread on a

slide with a toothpick, wooden applicator or platinum loop and a cover-glass on top, is the procedure most commonly followed in routine examinations in the laboratory. The report "twelve cover-slip preparations examined under the microscope were negative for ova or parasites" supplies the only information that we are accustomed to read on the charts of the hospital and on the laboratory blanks. In many hospitals the laboratory diagnosis of parasitic diseases is in the hands of interns.

Under the microscope, the elements most easily confused with eggs are the undigested vegetable cells. Having no uniform shape and being of different sizes and forms, they often simulate some of the parasitic eggs common in the United States and even some of the rarer forms of tropical origin which are imported into this country. These vegetable cells have a segmented inner structure and an outer cell membrane, not unlike some of the well known eggs of parasites. If the cover-slip is pushed from the side with a wooden applicator, these cells roll and, if pressed from the top, the inner contents are ejected so that the empty cell membrane remains, behaving in this fashion very much like a real egg. Ellipsoidal forms with a few segments give the impression of hookworm eggs. Oval, large, and with an "imaginary" operculum, they resemble the ova of *diphyllobothrium latum* (fish tapeworm), though the operculum is not characteristic of these eggs, particularly when they are recently voided. Large ellipsoidal cells stained with bile and with débris attached to the outer membrane give the impression of unfertilized eggs of *ascaris lumbricoides*. Old oblong cells with a yellowish tinge resemble dead eggs of *schistosoma mansoni*. However, in real eggs the characteristic lateral spine can be brought into prominence with a gentle motion of the cover-slip. In the case of *schistosoma hematobium* the egg is lanceolate in shape and longer, but the terminal spine is always detected. It must be borne in mind that the eggs of both species die if they are not placed in water, in which they hatch, water being their natural culture medium. One should comminute about one gram of the suspected fresh fecal material in about four ounces of water in case the specimen has to await study and then proceed with the final sedimentation concentration test. In this way the ciliated miracidium is very clearly seen moving inside the egg membrane, and there is no ground for error.

The specimens which are sent to the laboratory for examination are often so poor that they have to be discarded, or else negative findings are of little or no significance. Very poor or useless specimens are the following: the washings of an enema, the material obtained by purgation with castor oil, the hard lumps of feces obtained from patients who receive their daily dose of mineral oil or any of its preparations, specimens from an artificial diarrhea precipitated by a saline purgative in the haste to obtain the sample ordered. A satisfactory specimen of stool is one obtained from a natural movement of the bowels, even if it is necessary to wait. Another important factor is to keep the specimen in the proper condition by means of a

suitable container. Cardboard and paraffin containers are unsatisfactory. Half-ounce tin cans or wide-mouthed glass jars of two-ounce capacity should be used. However, it should be borne in mind that in the search for parasitic protozoa of the intestinal tract, if trophozoites or the vegetative forms are to be found, the stool should be passed into a warm bedpan and examined immediately, if possible on a warm stage. For cyst forms this precaution is not necessary.

With a better knowledge of the life history, habits, longevity and habitat of parasites, more specific methods are being formulated day after day for their detection. Tropical diseases are artificially transplanted into this "foreign territory." Since their seed can not spread on account of unfavorable environmental conditions, they do not constitute a problem from the public health standpoint but deserve the most careful attention as regards each individual case. These diseases are *ankylostomiasis, filariasis*, and *schistosomiasis mansoni*, found with relative frequency in patients in hospitals and clinics in or near districts where mutual ethnic attraction has created communities of considerable size. The city hospitals receive a large amount of this clinical material.

Each parasite has a definite predilection for some organ or region of the body, which can not as yet be explained in terms of biology or biochemistry; it makes the most spectacular journey in order to arrive at its destination. The three human flukes, the Trematodes of man which will be taken up later in this article, illustrate best types of adaptation and affinity for a specific system of the body.

ANKYLOSTOMIASIS (HOOKWORM DISEASE)

This is the most common parasitic tropical disease seen in our dispensary and hospital wards. Most of the cases are discovered by chance in the routine examination of feces. It is a chronic debilitating disease which lowers the body resistance to the more virulent acute diseases. It has an exceedingly high morbidity but a very low mortality. Patients who come from countries where *ankylostomiasis* is universal never mention the disease. They only give an account of symptoms which apparently have no relationship to the fundamental cause and at first usually reveal a secondary anemia and a mental attitude of apathy and melancholy. There is hardly any disease whose symptoms and signs can not be simulated by *ankylostomiasis*. Hence, it is very important to order an examination of the stools in patients who give a history of having resided in an endemic zone. In children, retardation of physical and mental development is a common manifestation of hookworm disease. Of course, the disease is also aggravated by adverse conditions such as unhygienic surroundings, a faulty diet, poverty and destitution, but the underlying factor which overshadows all other contributing influences and undermines the vitality of the young patients is the hookworm. The lack of a typical clinical

picture in *ankylostomiasis* is in sharp contrast to *filariasis, schistosomiasis* and other parasitic diseases, which present fairly definite manifestations and often give a history of long quiescent periods and acute stormy exacerbations. The erratic round worm may be discovered in the course of a bowel movement. The appearance of the mature proglottides in the bed linen and in the underwear and the discomfort they cause as they force their way through the anus by their own activity, discloses *tenia saginata.* The presence of white flat segments in the stool in *tenia solium* and the discovery of a long fragment composed of a rudimentary chain of fragments in the case of *diphyllobothrium latum* leave no ground for error. Itching in the perineal region and around the anus gives us the clue to the diagnosis of *oxyuris vermicularis.*

In cases of *ankylostomiasis* there are no anatomical landmarks, no boundary lines, no definite symptoms and signs. Slowly and insidiously this disease saps the vitality of its victim. These patients can be selected from the rank and file by their attitude, behavior, physical appearance, and manner of speech. It is true that each patient is liable to present a different complaint ascribed to an organ or system far disconnected from this debilitating disease, but most often they condense their whole story into the expression, "I am all in." On the other hand, as the action of the hookworm on the organism is quantitative rather than qualitative, mild infestations with a small number of worms may not produce any appreciable symptoms.

It is obvious that it should be a matter of routine procedure to examine the stool for the presence of hookworm ova in all patients who have lived in endemic regions and who have resided in this country for less than six years.

Illustrative Case. A married Puerto Rican woman, 24 years of age, came to the dispensary with symptoms of a mild psychosis. Her mental attitude was one of apathy and melancholy. She seemed confused, dull, unable to concentrate, and had lost interest in her home affairs and in her surroundings. The probability of a geographical etiology of her depression aroused suspicion and she was asked to bring a specimen of stool. Upon examination a considerable number of eggs were found. Following the second dose of oil of chenopodium within a period of two weeks, her attitude changed. In one month with four doses of 1.5 c.c. followed by a saline purgative each time, the patient had fully recovered from her mental derangement.

Biological Data and Laboratory Diagnosis. A clinical diagnosis of hookworm infestation without the aid of the laboratory is not only difficult but impossible, since many of the symptoms and signs, including secondary anemia, noted in this disease are common to other conditions. The discovery of eosinophilia is not conclusive since it is common to all helminthic infestations. Fecal examination, therefore, is the only accurate procedure

to follow, but several of the general principles of the biology of the hookworm should be well known to the technician. In fresh feces or at least within a period of three days, no hookworm larvae should be expected to be present. If some are seen moving with about the same morphology and the same general characteristics, they are the rhabditiform larvae of *strongyloides intestinalis* (*stercolaris*), a parasite distributed over the tropical and subtropical world like the hookworm, although these larvae are sometimes found in patients who were born in this city and were never outside of the urban zone. The intestinal form of female *strongyloides intestinalis*, which reproduces parthenogenetically, lays eggs in the intestines. Unlike the hookworm eggs which require external environmental factors for development, they hatch in the intestines. Consequently fresh feces will contain hookworm eggs and perhaps rhabditiform larvae of *strongyloides intestinalis*. Cases of pure *strongyloides intestinalis* infestation with diarrhea, emaciation, and marked secondary anemia have been seen in this city and recently on the Neurological Service of this hospital (the case will be reported at length in another issue).

In a comparatively old specimen of stool the three forms of the parasite, *strongyloides intestinalis*, may at times be seen lying side by side, namely, the rhabditiform and filariform larvae and the adult parasite. The filariform larva constitutes the infective stage of the parasite. During the examination of the feces in search for *ankylostomiasis*, an occasional egg found in the specimen should be no cause for alarm. This means that the infestation is so mild as to be classed as "negligible." As there is no internal reproduction, the chances are that the few parasites present will be expelled as soon as their life span has been completed.

Any technician may become skilled and proficient in identifying the egg under the low power of the microscope (16 mm. obj. and a 6 X ocular). The size and shape of the egg rather than its particular structure should be the guiding factor. The fresh hookworm egg has a characteristic ellipsoidal form with a simple contour inside of which the usual four segments can be seen in a perfectly clear shape. With time and further development in the feces under favorable conditions, more segments may be visible and even the very larva may also be seen moving inside the egg membrane, somewhat like the embryo or tadpole stage of *enterobius vermicularis*. The latter are flattened on one side, smaller, and exceedingly rare in fecal material, as the gravid female usually lays her eggs outside the anal ring and in the perineal region.

The Willis method of stool examination with minor modifications is the procedure which is best adapted to all needs because of its rapidity, simplicity, and reliability. The fecal material is collected in the usual one-quarter ounce tins used for the collection of stool samples. Part of the sample is removed, enough being left so that the tin is not more than one-sixth full; this is equivalent to a little more than one gram of feces. A

saturated solution of common salt is then added, drop by drop, with constant stirring to insure as complete comminution as possible, until the container is full to the brim. The specimen is allowed to stand a few minutes to allow the eggs to rise and is then covered by a 2 by 3 inch, clean, polished slide in contact with the surface of the fluid. After about five minutes the slide is removed, inverted and examined for the eggs which float in the surface film of the fluid on the slide. Minor modifications, which have certain advantages, have been introduced by me. About one gram of feces is placed in a one-quarter ounce tin. Immediately a saturated solution of common salt is added to fill one-half of the container. With two wooden applicators the material is thoroughly comminuted in the solution and as soon as this is accomplished, the container is filled up to the brim. At this point floating débris and undigested particles are removed immediately with a small piece of wire gauze held in a forceps. With a dropper more solution is added drop by drop until the surface of the liquid is perfectly even with the edge of the can and now the 2 by 3 slide is placed on top in such a way that no air spaces or bubbles form for lack of solution. After five minutes, but preferably after ten or fifteen minutes, the slide is lifted and immediately inverted; the preparation is spread evenly with a toothpick or wooden applicator inside the circle of crystallized salt formed at the edge of the tin where it was in contact with the slide. It is examined, uncovered, under the low power of the microscope. Keeping the microscope on a level surface and shutting off currents of air, the eggs appear evenly distributed. It should be borne in mind that the salt solution dries up very quickly in the uncovered preparation and that rapid search for the eggs should be performed in as short a time as possible. The gravity of the infestation is determined by the number of parasites present and *not by a mere diagnosis of "positive."*

FILARIASIS

Filariasis is no longer regarded as a rare occurrence in this metropolitan community; this is due not only to the immigration of people from the tropics, but also to the fact that many patients come North as a therapeutic measure. Acute attacks of *filariasis* are rarely seen in this climate, for here the disease remains in a quiescent stage for years. It flares up with the striking syndrome of chills, high fever, headache, nausea and vomiting, and lymphadenitis upon the return of the patient to his native land. Change of residence, thus, does not cure *filariasis*. It does retard its progress and delays the development of the late manifestations resulting from repeated attacks. It may also be said that the adult filaria may eventually die of maturity without having caused any appreciable disability. In spite of the inhibiting influence of the northern climate on the adult parasites, many patients suffer from the so-called "equivalents," such as slight malaise and very mild lymphadenitis. This is particularly

true of female patients who are subject to these equivalents during the menstrual period. They, of course, are not sick enough to seek admission to a hospital but often come to the dispensary complaining of some unrelated symptoms. On the other hand, patients with late manifestations of *filariasis*, namely hydrocele, lymph scrotum, varicose lymph glands, elephantiasis, and chyluria are more likely to be seen on the wards. In one patient, a native of French Guiana, numerous microfilariae were found in the liquid extracted from a hydrocele. No microfilariae, however, could be demonstrated in the other patients suspected of this disease, even after repeated examinations. They were probably "burnt out patients," as in every instance a reliable account of *filariasis* could be obtained, which included a history of the disease in the family and a long residence in endemic areas. These two points in the history of the patient, when added to the characteristic physical signs, are sufficient to justify the diagnosis of the disease even in the absence of microfilariae. A patient with chyluria, recently demonstrated on rounds, gave a history of active *filariasis* in his wife and sister and of having resided many years in a well known focus. Though no microfilariae could be demonstrated in the blood and other fluids of the body, the diagnosis was justified in view of the clinical features, family history and geographical etiology.

Laboratory Diagnosis. The following three methods are best adapted to the detection of microfilaria because of their simplicity and reliability in the examination of specimens of blood.

The Fresh Thick Smear. A thick drop of blood is taken. With the needle the smear is spread over an area about the size of a dime and immediately, before it dries, it is examined under the low power of the microscope. The microfilariae or filarial embryos can be easily detected moving actively in the mass of red cells.

The Acetic Acid Concentration Method of Rivas. This method is satisfactory and easy to perform. About 0.1 to 0.5 cc. of blood is collected from the finger and placed in about 10 cc. of a 2 per cent acetic acid solution. After shaking to complete hemolysis, the mixture is centrifugalized. Fresh cover-glass preparations are made from the sediment and examined under the low power of the microscope.

The Permanent Stained Preparation. This method is advisable when the examination can not be carried out immediately. Excellent results may be obtained with the Giemsa stain by using thick smears and double strength of the stock solution of the stain, that is, two drops per cc. of distilled water. Both in *malaria* and *filariasis*, let the thick drop dry in the air on a level surface for at least one hour before immersion into the staining jar.

SCHISTOSOMIASIS MANSONI (BILHARZIA)

The *flukes*, the *trematodes* of man, display the best form of adaptation for a selected system of the body. After emerging in the form of a *cercaria*

(infective larva) from the intermediate host, the *snail*, they make a most complicated journey to the suitable tissue or spot best adapted to meet their life requirements. People acquire the infestation by bathing, wading or washing their hands in shallow pools, irrigation ditches or slow moving streams where the intermediate host develops. As they penetrate the skin, the larvae produce itching and, at times, urticaria. They enter the venous circulation and reach the liver, frontal vessels and mesenteric veins through the systemic circulation. In this location, on reaching maturity, they mate; the female attaches herself to the male and they travel against the blood stream by way of the inferior mesenteric vein; the *schistosoma hematobium*, to the vesical plexus of veins through chains of anastomoses.

Schistosomiasis of the intestinal type, produced by *schistosoma mansoni*, is found quite often among Puerto Ricans and South Americans coming from endemic regions. Here again the geographical etiology of parasitic diseases should be borne in mind when patients come to the physician complaining of gastric distress, fullness after eating, belching, and of general uneasiness in the epigastrium. Hepatosplenomegaly is quite common and should be looked for though it is not pathognomonic. In children, in adolescents, and in mature people, "gaseous" stomach and a facial expression of premature senility are also suggestive signs. Occasionally advanced cases are brought to the emergency wards with profuse hematemesis.

Biological Data and Laboratory Diagnosis. In endemic centers water is the natural medium wherein the extracorporeal development of the parasite takes place. The egg hatches in water and the miracidium swims about until the mollusk host is penetrated. From this host a transformed larva emerges which constitutes the infective agent that enters the skin of man. If all this cycle takes place in water, then tap water at room temperature is the best medium at our disposal to deal with the ova of schistosoma mansoni.

The technique of the sedimentation concentration method is based on natural factors and for general purposes is quite satisfactory: One gram of suspected material is placed in an 8-ounce photographic graduate and water is added to the 2-ounce level. The mixture is comminuted and the vessel filled with water. The mixture is passed through an 80–100 mesh sieve into an 8-ounce urine sedimentation glass and the sediment allowed to settle for about fifteen minutes. A pipette is inserted through the liquid, a small portion of sediment is removed, enough to be covered by a 1 by 1 cover-slip. For identification in the microscope a 16 mm. objective and a 6X ocular are sufficient, provided a smooth mechanical stage can be used so that the whole one-inch square area may be covered in as short a time as possible. In this way several cover-slip preparations can be examined in case the eggs are few in number. The ova reach the lumen of the intestine by passing through the mucous membrane. As they force their way through the tissues like foreign bodies, they cause attacks of dysentery,

particularly at the beginning. Therefore, more eggs are found in the outer portion of the formed stool, that is, that part of the stool which is in contact with the mucous membrane of the rectum. Hence, the outer surface of the stool is scraped off with a common wooden blade and is placed in the tin can or jar from which the 1-gram sample is removed for the sedimentation process, as outlined above. In mushy and diarrheal stools, small portions containing flakes of mucus are the best.

It is essential to remember that the egg of *schistosoma mansoni* and *hematobium* looks very much like a tiny oyster with a yellowish tint. The lateral and terminal spines are characteristic in both species. With proper focusing the miracidium can be distinctly seen moving inside the egg membrane if the fecal material is comminuted in water as soon as the fresh sample is received in the laboratory. Here, in New York, I have often seen free swimming miracidia in feces examined in tap water at room temperature. This was because some eggs had hatched the day after the specimen was received.

More than once cases of hepatic cirrhosis of the Laënnec type, with a long history of alcoholism manifesting repeated attacks of hematemesis requiring repeated blood transfusions, have proved by laboratory studies to be cases of *schistosomiasis mansoni*. One patient of this type (Adm. 352597) was brought to the emergency ward with profuse hematemesis. Twenty-one years previously he had left the location where he had acquired the disease. Moreover, patients with hepatosplenomegaly who exhibit all the classical symptoms and signs of Banti's disease have also been shown to be only cases of *schistosomiasis*. Not only were the eggs of the parasite demonstrated, but specific treatment with fouadin brought about satisfactory therapeutic results.

VOLUME III NOVEMBER-DECEMBER, 1936 NUMBER 4

JOURNAL
OF
THE MOUNT SINAI HOSPITAL

NEW YORK

THE EDWARD GAMALIEL JANEWAY LECTURE

DIRECT ACTION IN MEDICINE[1]

THE RT. HON. LORD HORDER, K.C.V.O., M.D., F.R.C.P.

[*Consulting Physician, St. Bartholomew's Hospital, London, England*]

I desire in the first instance to record my appreciation of the honor paid to British Medicine in general and to myself in particular by the invitation to deliver the Janeway Memorial Lecture. My own pleasure is all the greater because of my association over many years with your distinguished consulting physician, Dr. Emanuel Libman, a name to conjure with in my own country as well as in yours, and several of his colleagues.

Edward Gamaliel Janeway was attending physician at The Mount Sinai Hospital from 1883 to 1897 and consulting physician from 1897 to 1911, the year of his death. The Janeway Lecture was founded by an anonymous patient, with the object of "bringing important investigators to The Mount Sinai Hospital to present the result of their work." I follow very distinguished men this evening: McLeod, Aschoff, Von Mueller, Anrep, Pick, and my own countryman, Thomas Lewis.

The responsibility of deciding if I can properly fulfil this object of the generous donor of the Endowment rests with others. I hope they will not be too severe in their criticism of the matter of my lecture, the text of which will itself best explain why it is that I do not this evening present the result of a specific piece of work so much as the result of standing aside for a little and viewing the field of therapeutics as a whole.

Despite a certain amount of not unhealthy criticism, the serious public has no doubt about the fact that Medicine does advance, however slowly. Nor, with all our discontent when we are faced with incurable disease, have we ourselves, on serious consideration, any doubt on the matter. But our discontent is itself a healthy element in the spirit that animates us. There are certain advances to which we can point and they not only give us hopes for the future, they show us the way by which fresh successes may be

[1] Delivered at the Blumenthal Auditorium, The Mount Sinai Hospital, New York City, May 15, 1936.

achieved. In the realm of therapeutic research the stories of insulin and of liver therapy stand out prominently as having provided us with novel forms of treatment. The dreary lives and outlook of thousands of diabetics and sufferers from pernicious anaemia have been completely changed by these two advances, which are all the more welcome in that the diseases concerned have increased in incidence in recent times. Be it observed that in both of these instances the results have been won by long and patient research and strict adherence to the principles of physiology and the established facts of chemistry and histology.

The application of technique to therapeusis has led to equally sound new methods. The surgeon has applied his craft to the solution of various problems, fusing his efforts with those of the physician in more than one field. That of pulmonary tuberculosis affords a striking example: artificial pneumothorax, phrenic avulsion and thoracoplasty, as methods of collapse therapy, have assisted greatly in securing physiological rest and healing of the diseased lung. Blood transfusion has not only saved many lives by the simple process of correcting an ischaemia and thus enabling the haematopoietic organs to function; it has also enabled us to exploit methods of treatment which would otherwise fail of their purpose.

The technique of the radiotherapist has become highly efficient, both in X-rays and in radium, and the overlap of his work with general medicine and with surgery has grown steadily. The physiotherapist, too, has brought many forms of technical help to a high pitch of usefulness. Indeed, he offers us what amounts to almost an embarrassment of riches, and we are perhaps a little in danger of being cluttered up by pieces of machinery which we are tempted to use a little indiscriminately. It is as though a nervous or inexperienced fireman might play his hose and wield his axe, first here, then there, without much purpose, doing harm as well as good, and perhaps more harm than good. Only for a hose and an axe we substitute numerous kinds of implements—ionization, diathermy, ultraviolet light, high frequency, short-wave therapy—a whole series of physical methods. It is to be hoped that no new method will be introduced yet awhile, so that we may get our breath and meantime exercise some discrimination and forbearance in the use of the methods at present available. Outside the profession the fashionable quack tries all of these in turn on the same patient, hoping that by a process of trial and error he will get a result before the client's patience and purse are exhausted. Even inside the profession there is not yet as much evidence as we might wish that the man controls the method rather than the method the man. Physiotherapy must go much further than this and be guided by the fundamental principles both of physics and of clinical medicine before it takes its proper place—clearly a very important one—in rational therapeutics. The oft observed tendency of the physiotherapist to isolate himself is doing his branch of medicine a great disservice. Isolation in any therapeutic field is

fatal when the patient's best interest is considered, and it behooves the physiotherapist to keep closely in touch with the clinician on the one hand and with the physicist on the other if he is to do his best work.

I propose now to glance at some fields of therapeutic endeavour which are more complex than those which I have just mentioned and in which, as it seems to me, this close and essential alliance between method and principle is broken. It is not always easy to see at what point the divorce has taken place, but in some instances, at least, it has occurred because we have tolerated, without protest, a looseness in the use of words. If we once get slovenly on the point of terms and definitions, it is only by a happy accident that we can achieve anything. The curse of Babel was not more calculated to prevent concerted action among laymen than is indifference in the use of terms calculated to confuse and hold up progress in any branch of science. This is one of the chief reasons, perhaps *the* chief reason, why it is of paramount necessity that the doctor should be properly taught before he begins the study of medicine as such. And this is why I am never tired of saying that the first textbook of medicine should be Jevons' primer of logic. It costs less than half a dollar, but to the embryo physician it is worth untold gold.

Take the word "specific," for example. Until recently, the meaning of the word, when used in immunotherapy, was precise and free from all ambiguity. But we have today arrived at a state of complete confusion as regards its connotation, or many people have. When we use an immune substance whose source bears a definite relation to the causative organism of the disease, we call the substance "specific," and if its use is successful, or even if it is not, we call the result observed a specific effect. Today, we see preparations put on the market which are advocated for use in infections of quite different nature—differing as much as influenza differs from furunculosis—and they are credited with containing "the specific antibody," whatever that may mean. A large trade is done in these things, and done, it must be admitted with regret, through the profession. This is the result of two tendencies, both of which should be resisted. One is the fear lest we be caught out by not being up to date with our remedies and the other is a weakness in yielding to the popular clamor for quick results.

When we think clearly on the question, it becomes obvious that the disharmony which we call disease can only be adjusted through the operation of processes which are already inherent in the body. We can not substitute new processes; we can only assist and control those by which life and health are being maintained. To realize this is, I take it, the raison d'être of much of the doctor's training. Not to recognize this basic fact and to suppose—which is the logical inference from some folks' efforts—that we can replace nature's mechanism by another which suits our purpose, and our desire, much better, leads inevitably to an increase of that

tendency in modern therapeutics to which I have given the name "direct action," as the best way of getting an ill person restored to health.

I am not a believer in the efficacy of direct action in the political sphere; but, however that may be, I am convinced of the fallacy of it, in the majority of cases, in the sphere of therapeutics. It is, however, becoming more and more popular.

There are, as we know, some diseases which do call for treatment by direct action—action which is urgent, too, in its insistency. For the most part these instances are accidents rather than disease processes. Acute poisoning calls for prompt elimination and neutralization. Cessation of breathing demands artificial respiration. A foreign body in the larynx must be extracted as soon as may be. In the "acute abdomen," if the diagnosis favors the rupture of a hollow viscus, the peritoneal cavity must be opened forthwith. In all these cases expediency rules. But even in the "acute abdomen," if the diagnosis is clearly that of an inflammation, direct action is not necessarily indicated. After forty years of familiarity with so common a disease as appendicitis, there is still no rule of practice, even amongst surgeons, for two authorities of equal experience and equal technical ability may decide upon quite different lines of treatment. Nor can matters like this be decided by statistics, as some fondly suppose.

Direct action is, of course, the main appeal of the quack medicine to the credulous public. The reader of the advertisement can not withhold his confidence in a remedy whose very name suggests that his dominant symptom is its sole and its immediate objective: "Jones's backache pills," "Smith's blood mixture," "Robinson's asthma cure," and so on. "Purple pellets for pallid persons," in addition to the attraction of alliteration, stresses the appositeness of the remedy for the particular purpose. These things lie outside medicine. The empirics, however, do not monopolize this form of appeal; and though such names as "spasmalgin" and "phenodorm" are perhaps admissible, seeing that the main actions of these drugs may be allowed to dictate their names ("morphine" might be advanced as a precedent), and even "regulin" may be forgiven for somewhat similar reasons, what shall we say of "arthrytin," "anti-bacsyn," and of "antimalignyn?" These names offend, not only because they put the doctor's mentality on a level with that of the ignorant layman, but because they suggest that a number of disease processes which are widely different are all of them amenable to the same chemical substance. I do not think that the doctor-turned-chemist is of help to us in these matters. I think we have trouble enough as it is to resist the blandishments of the chemist proper. Formerly the chemist was the servant of the doctor; today he has to a large extent become the doctor's master. His preparations are so elegant, the troubles for which he offers them are so obviously just those for which we have long been awaiting an efficient remedy, and the presentation of his thesis is so attractive, that we succumb all too easily to his blandishments and to his dictation.

I recently asked a friend of mine engaged in a busy practice what determined his decision to try any of these new remedies with advertisements of which we are all of us daily bombarded. He said he was governed by two criteria. The first was the reputation of the firm which put the preparation on the market, and the second was the quality of the literature which introduced it, by which he meant the degree to which he was convinced by this literature. Now his first criterion ought surely to be a sound one. There are several old-established firms trading in your country and in mine whose products can not only be counted upon to be pure and accurately assayed, but who spend a large sum of money annually in useful experimental work and maintain efficient laboratories with a distinguished personnel, designed to place their newer preparations upon a sound scientific footing before they recommend them. But of a number of other firms, and some private individuals, the same can not be said. The tendency to rush a remedy on to the market before it has been brought under scientific control is increasing and should be severely discouraged. I wish I could say as much for the second criterion. But it is no reflection upon a busy practitioner to suggest that he may not be familiar with the fallacies involved in a specious pamphlet. The alleged actions of a drug which call forth the eloquence of the traveller, untrained as he often is in the principles of our work, do not necessarily always appeal to us. The other day I was solicited to give a trial to a new and perfect intestinal disinfectant, that consummation so devoutly to be wished by many. I was told that it rendered the faeces quite sterile. My imagination toyed with the thought of what might happen to a patient with sterile faeces, and my interviewer seemed surprised that I did not share his enthusiasm, even if I could not deny his fact.

Allied to direct action, and often accompanying it, is what I may call the "mass attack." In the matter of dosage we have in recent years tended a good deal in the direction of the mass attack. In some cases this has proved useful, but not, I think, in all. We have seen a revival in popularity of a number of old remedies, some of which, though they have never entirely dropped out of use, had come to be employed less frequently and with less confidence in their efficacy. The revival has, in some cases, been accompanied by an effort at greater systematization, and this has undoubtedly been to the good. We can not accuse all the physicians of the last century of engaging in dilute therapeutics (*pace* our homoeopathic friends), but we have, in some well known instances, gone far beyond them. Even in the use of salicylates in rheumatic fever our doses exceed theirs, and this is true even though we see much less than they did of the severe forms of the disease. The prevalent use of quinine in malaria is another instance of the same tendency. Alkalis were given in peptic ulcer, but the effort now made at "alkalinization" is relatively new, and the picture of alkalosis, not infrequently seen, was probably unknown to our teachers. Iron, again, was given in chlorosis, and freely, but with the disappearance

of that disease and the experience that the metal was of little service in Addisonian anemia, iron dropped very largely out of practice or was only employed as a tonic and chiefly in the form of the scaly preparations. We now give iron more frequently and in a variety of anemias, prescribing massive doses. The metal has so low a degree of toxicity that, even when these large doses are not helpful, they do not seem to harm the patient. In streptothrix infections we use the iodides, or some other form of iodine, in much larger doses than did our predecessors and with good results. True, there was always a school of therapeutists that gave iodides very freely in syphilis, though another school took the view that the same good results might be achieved by smaller doses.

Of special interest in this connection is the use of digitalis in cardiac diseases. "Digitalization," achieved by giving large doses at frequent intervals until physiological effects are observed, has become a familiar method. It is interesting to note that this was suggested a long time ago by Balfour. One result of the popularization of this intensive method seems to be that digitalis has fallen into disuse to a large extent in a number of the less dramatic forms of circulatory trouble, in which it was formerly employed with benefit. The extreme position in this matter is taken up by those who teach that the only indication for digitalis is auricular fibrillation. Such a severe limitation to the use of the drug denies to many patients its helpfulness in a number of other conditions, for example, in the milder cases of the senile heart and in the circulatory disturbances associated with renal disease. No doubt the relative infrequency of primary mitral incompetence in these days, following upon the infrequency of rheumatic valvulitis of the more acute type, denies the younger practitioner the ocular demonstration of the dramatic effect of digitalis with relapse after relapse in such cases (showing no arrhythmia), which was formerly such a common experience. In short, the apotheosis of mitral stenosis with cardiac arrhythmia has aroused so much interest in this form of heart disease that some of the other forms, especially as seen in private practice, have been, as it were, "blacked out" of the doctor's mind. And it is in these forms that smaller doses of the drug are so effective.

Thoroughness in treatment always makes a great appeal to me. Sceptical by nature, my first reflection when I am told that a patient is cured is that he probably is not. The dogged persistence of a disease process once started, and whether the original irritant be microbic or not—but especially if it be microbic—is a lesson that experience alone teaches us. In particular we see this with such infecting agents as those of syphilis, tubercle, and the less virulent types of the streptococcus and coliform bacillus groups. "Remissions," yes; "quiescence," yes; but "arrest," possibly yes, but probably no. Anyway it is better to assume "no" in the patient's interest and persevere with whatever appropriate remedies we have, long after the signs and symptoms have gone, and even after specific "reactions" have

disappeared. Our fathers knew this and acted accordingly. But should it be by intensive methods from time to time or by steady slow persistence with small doses, or by intensive methods first and by slow persistence with small doses afterwards? Even today these questions have not been finally answered. The pendulum of practice still swings. Syphilis is, as we know, a pertinent example. The arrival of "606" was heralded by the hope of a *sterilisatio magna*. But with the reluctant relinquishing of this ideal and the resentment shown in many patients by certain organs, and especially the liver, to a mass attack, a less vigorous onslaught has been made, and this even though the modern equivalents of the drug and supplemental or substitutional drugs are much less toxic than was the original. The problem, indeed, is not the simple one that some of us still seem to think it—of a foreign foe invading the home country, wandering about the surface of the land, and capable either of being rounded up and chased back across the frontier or killed in the open by shrapnel and machine guns. The very first symptoms of the disease indicate that the enemy is already dug in; more than that, he has fraternized with the home troops and with the civilian populace, and even with the governing elements themselves.

In syphilis, which certainly does give us a model for therapeutic exploitation—even though we may not subscribe to that quaint doctrine which holds that there is one disease, and syphilis is its name—it is interesting to note a recent tendency to return to the older method of Hutchinson and to treat the patient by small doses of mercury over a period of two years at least. This method of using drugs known as "alteratives," of which mercury was one of the most important, was in vogue long before Hutchinson's day. The poet Crabbe has a couple of lines that clearly refer to this custom:

> "Here alt'ratives, by slow degrees controul
> The chronic habits of the sickly soul."

But the method of the storm troops is still the favorite with many—to make a sudden and overwhelming attack. Exactly what the human body will stand in this, with damage it is true, though with damage which may not be lethal, is well illustrated by a patient recently under my care in St. Bartholomew's Hospital.

A healthy young Jew of 22 was admitted on April 4th. His history was that he had developed a primary sore and also showed some symptoms of a general infection three years before. He went to the venereal department of a London hospital, was found to have a positive Wassermann reaction, and was treated by arsenic and bismuth. He received in the course of three months 4.95 grams of N.A.B. and 8 cu.cm. of a 20 per cent glucose solution of bismuth. His Wassermann reaction was negative at the end of this treatment. Five months ago he presented himself again at the same hospital. His Wassermann reaction was still negative. He was given two injections of neokharsivan, and, as he felt ill, this was changed to

acetylarsan, of which he received 2 cu.cm. on two occasions. He was then given four injections of 0.6 gram each of sulphostab and also four injections of 2 cu.cm. each of bismuth oxychloride. He then complained of irritation and redness of the skin of his lower limbs. Two months ago, between February 10th and February 24th, he received three injections of 0.6 gram each of the same sulphur preparation and three injections of 2 cu.cm. each of bismuth oxychloride. Eight days before admission the patient complained of colicky pains which doubled him up, nausea, constipation, and cramps in the legs. On admission there was an intense black line on the gums, a good deal of gingivitis, and all the front teeth were loose. Four days after admission deep jaundice appeared. My colleague, Dr. Harrison, demonstrated bismuth in as little as 150 cu.cm. of urine and detected arsenic in 0.25 gram of hair. But the patient left the hospital on April 28th, apparently well.

Such thoroughness, such an implacable determination to purge the patient of his peccant humor at all costs, is reminiscent of the old story of the French dermatologist who accepted the challenge to cure the intractable skin disease—another arsenic story. It also reminds me of a candidate whose examination paper I once corrected. The question was about "anthrax (wool-sorters' disease), with special reference to its preventive treatment." "This," he said, referring to prevention, "is very important." (He might count on full marks thus far, at all events.) "All infected animals," he proceeded, "must be burnt or buried alive; and the wool-sorter must be boiled." And so this dangerous trade should come to an end forever; nor would the distracted student, unless questioned upon the history of medicine, ever be subjected to this particular form of tyranny again.

In the case of drugs the individual tolerance varies greatly for particular poisons, as we know; therein lies the chief risk. The trouble is, no doubt, that we know so little about the way in which drugs act. That they act indirectly rather than directly seems certain. This supposition is very old: witness the very word "alterative." We do not seem to have got much nearer to an explanation than had those who coined the word originally. The chief change we have made, or rather attempted, is to try and effect the alteration rapidly instead of slowly, and we are quite uncertain if this effort of ours spells an advance or no. That same power of adaptation to which I have referred is what makes "shock therapy" possible. Quite a large number of modern treatments are really of the nature of shock therapy, though they do not always carry this name. In treating patients suffering from acute infections, provided the severe jostle which we give to them by the use of chemical shock can be withstood, it is hoped we may cut short the course of their disease. Thus, I read in a brochure issued by a well-known firm of chemists that "a timely injection" of one of their preparations "will often enable an influenza patient to resume work on the third

day." If this be so, to use a vulgarism, that is clearly "the stuff to give him." Unfortunately, the reliance placed upon this class of remedy is often such that nothing else is thought necessary by way of treatment or even by way of comfort.

During a recent epidemic of influenza I was summoned one evening to see a doctor whose wife was alarmed by his condition. On arrival I found my friend in a state of collapse. It appears that he had developed the disease the night before and had sent for a colleague in the morning. The colleague injected a dose of this very preparation (and surely in "timely" fashion) which makes work possible on the third day and assured him that he would be all right as the result of it. But finding himself distinctly worse in the afternoon, he rang up his colleague, who was out on his rounds. His partner kindly called and injected a rival remedy, likewise departing with the same hopeful assurance. In the evening he was so ill that, as I say, his wife took fright and sent for me. I rendered first aid by way of volatile stimulants and tepid sponging, and installed a nurse. The disease then seemed to run its natural course, uninterrupted by the further use of large chemical molecules designed to "disperse the negative particles of the blood" or by "calcium in association with specific globulin." A grateful letter from the patient completed the incident, which I present to you as a modern version of the story of the good samaritan.

Safer and more canny was the method adopted by another doctor who was consulted by a patient on the first day of an influenzal attack. "Yes, it is called influenza," he said, "but 'influenza' is really the result of intestinal intoxication. However, I will put you right." He reached down for a dose of his own particular variety of chemical shock and injected it. He then wrote out a prescription, just as any of us more ordinary folk might do, for ammonium acetate, squill, and sal volatile, to be taken every four hours. And finally, to make assurance trebly sure, he handed over twelve homoeopathic powders, one to be swallowed hourly until the fever abated. Some of us hope to succeed in making the best of both worlds, but here was a bid to make the best of three!

The lust for specific and single remedies which may yield quick results lays bare a paucity of resource in many of us which strikes the older practitioner as evidence either of hasty and incomplete training or of lack of experience. In the treatment of the pneumonic patient there is often much talk of serum, but very little contribution to recovery along the lines that were formerly called "expectant." Expectant measures have always been scouted by the patient's friends; in these days of quickly acting remedies such things are regarded as signs of inactivity. "Then is there nothing you can *do*, doctor?" is, as we know, a common question. The older practitioner, faced with this query, carried on in silence, or, if time and patient allowed and a semblance of understanding in one or two of the relatives deceived him into so doing, he pointed out that, though no one of

these expectant measures was of great importance in itself, the dozen or more of them taken together often meant the difference between life and death. Today many practitioners have yielded wholly to the demand, and having injected the magic dose, do little else, and so are expectant indeed.

The relative infrequency nowadays of certain diseases and the lessened severity of others have removed from the doctor's experience, and also from that of the nurse, very valuable material for providing schemes of treatment. Thoracic aneurysm is comparatively uncommon, so much so that when a case comes under treatment, accessory measures, such as absolute recumbent rest and a special diet, find no place in the programme. The name of Tufnell may not even be known. Severe typhoid fever, which gave opportunities for treating patients suffering from continued pyrexia, troublesome tympanites, diarrhoea, and rectal hemorrhage, is rarely seen today. When, therefore, these symptoms occasionally appear nowadays, either in severe typhoid or in other diseases, they are prone to get very scant attention. The management of high pyrexia in influenza is often of the crudent kind. The patient gets the bedclothes which his sensation of "chilliness" demands rather than those which the thermometer indicates, and the arts of cradling and sponging have been to a large extent lost. The older practitioner must, again, be struck with the general air of restlessness and bustle in our modern efforts. Hilton's *Rest and Pain* was one of his textbooks, now read but rarely. But has there been any change in the processes by which, say, resolution of inflammation in the mitral cusps, the kidney, or the lung, is effected? No, Nature is just as conservative as ever, and though *we* turn radical, with the best will in the world we shall not make her budge one iota. Coax her, yes; lead her, yes; educate her, yes; but bully, shove, or hector her, no. The time element can not be eliminated, even if it can be shortened, in the processes of healing.

On reflection I fear it may be thought that much of what I have been saying this evening sounds like an indictment of modern therapeutic methods in general. But I do not intend this. I have referred to what can be done by the working out of therapeutic problems when the accumulated facts of animal chemistry and histology are submitted to patient thought and research. I have also referred to the great change along certain lines of treatment which technical skill in physics and in the craftsmanship of surgery have brought about. But I do feel that a word of warning is necessary against the incursion of what I may call the "mass-man"—the apostle of direct action—into medicine. I share the feeling of discontent as to the past, and I want, as much as anybody, to—if I may use a vulgarism again—"get on with it." I do not say that the past times were better than these, but I believe that if we want to improve upon the past, our only way of doing so is to use the past and all its teaching for the purpose of new endeavors. I am sceptical of tendencies that dissociate themselves from known physiological principles, and therefore I am scepti-

cal of remedies that are thrust upon us from outside, the result of ill-digested hypotheses, and which have never been submitted to proper control. Equally am I sceptical of remedies which, though they arise inside, are hurried into the therapeutic field by enthusiasts and jealously guarded against healthy criticism.

No doubt our fathers in the therapeutic field thought too much and tried too little. I am not sure that we, in our turn, have not reversed the error. We have been deluged with new facts and we clamour for still more. Though we are already dyspeptic, we want still more food to bolt. We suffer from a sort of mental achylia. There seems no time to chew; and thought, which is the juice by which facts may be prepared by assimilation, has become *démodé*. Our textbooks are "synopses." Our scientific meetings serve very largely the purpose of cataloguing more and more conclusions of disconnected researches. Shall we not soon begin to piece things together a little? A table of figures, a graph, a mathematic formula give us the comfortable feeling that we are arriving at exactness and precision; and so we paste them on the walls and call them a "scientific exhibit." But to produce these things is the function of the instrument and the machine rather than of the mind. They are merely the pabulum for the mind; they are not the product of the mind's synthetic faculty. And synthesis is essential to progress.

I believe wholeheartedly in research. "Seek out Nature by observation and experiment," said the great founder of scientific medicine. But Harvey's real greatness lay not so much in the discovery of new facts, as in the power of his mind to dissociate and to assimilate, and thus to construct new ideas. The labours in his laboratory were essential, but those frequent pacings to and fro under the trees at Coombe were vital. I sometimes wonder if it would help us to close down the laboratories for a while, to hand over the wards to our juniors, and to get together and to try to see where we are. Perhaps we could then marshal our facts clinical, immunological, and morbid anatomical—see where the gaps are and begin to make more concerted efforts to fill them. Having done this we might try to dissociate and combine them by deliberation and constructive thought. Bacon complained in his day that "physicians, after the manner of spiders, spun webs of sophisticated speculation out of their own bowels." I sometimes wonder if we have swung to the other extreme and have eliminated thought altogether?

The truth is, although science never offered us so many new facts before, or so many new instruments for possible exploitation, we seem for the time being less capable than we were of making use of them, except, as I have said, by way of direct action. The proper adaptation of scientific discovery to medicine requires, as already pointed out, the careful application of physiological principles and a knowledge of the deviations from the physiological that constitute disease. This involves indirect action, which

does not fit with the spirit of the times. Just as nations have become intolerant of the past, have revolted against the lag which tradition and convention seemed to be putting upon human progress, and have decided to attack their troubles by some direct and dramatic movement, so in the struggle with disease we are exhibiting a like intolerance with the slower methods of past generations, and many of us have decided upon direct action. In both cases the decision leads to a great adventure which, if it succeeds in establishing harmony for the time being, must still and inevitably be followed by a return to principles from which there is no permanent escape. But if the adventure fails, it spells a worse disease, or death, to the body politic and to the patient alike.

There is a story told concerning the men who first conceived and drew up the constitution and working plan of the Soviet State. Whilst in doubt about the practicability of their scheme, it was suggested to them that they should inquire of a certain wise old rabbi if the thing were feasible. Accordingly, they presented themselves at the cave of the recluse and, showing and explaining the scheme, they asked if it could be carried out in Russia. The old man reserved judgment and bade them come again the next day. They returned in due course, and the rabbi said to them: "Yes, this thing can be done in Russia . . . *but no one will live there.*" There are things that can be done in therapeutics which may not be worth doing. The mass-man, in his effort to heal the troubles of the world, has become primitive. That he is Bolshevist or Fascist or Nazi is not the thing that matters. What matters is that he has cut himself adrift from culture—a fatal detachment. I think that we are seeing an analogous movement in therapeutics—its invasion by primitives, bent on seeing what can be done by direct action severed from physiological principles and a corpus of knowledge of disease which we call pathology. To which, inevitably, we shall some day return; I trust at not too distant a date.

A CASE OF ACUTE PURULENT PERICARDITIS WITH BILATERAL EMPYEMA TREATED SURGICALLY

JOSEPH B. STENBUCK, M.D.

[*Surgical Service of Dr. Ralph Colp*]

During the past twenty years, no case of acute purulent pericarditis (except the one to be described) was operated upon successfully at The Mount Sinai Hospital. Indeed, only one case was operated upon in the course of that time. Prior to this twenty year period, Dr. Lilienthal operated upon two cases successfully, one of which is described in his "Thoracic Surgery." During the past nine years, in approximately 4000 autopsies at this hospital, acute purulent pericarditis was found in 67 cases, according to a personal communication from Dr. Klemperer. The following case of acute purulent pericarditis and bilateral empyema with successful surgical drainage is presented not only because of its rarity but also to draw attention to a condition so frequently undiagnosed and to permit early surgical drainage of the pericardial cavity.

CASE REPORT

History (Adm. 392657). A boy, 5 years old, was admitted to The Mount Sinai Hospital on January 5, 1935. About three weeks before admission he showed signs of coryza and had a mild cough which lasted approximately a week, when suddenly he had a generalized convulsion and became unconscious for a short time. His temperature rose to 103°F.; the cough increased and marked dyspnea and prostration developed. All of these symptoms increased in severity and for several days abdominal pain and distention were present. A few days before admission the family physician aspirated some clear fluid from the left chest. The family history and previous history were negative except for the fact that the child was born prematurely at $7\frac{1}{2}$ months and since then had been small and underweight.

Examination. The boy appeared to be extremely ill; his temperature was 103.6°F., respirations 28, pulse 139 per minute. His face was flushed, and his lips were cyanosed. Labored respirations were accompanied by an expiratory grunt and dilatation of the alae nasi. Labial herpes was present. The left chest barely moved on respiration, and there was dulness to flatness on percussion over it. There were greatly diminished fremitus and breath and voice sounds. The right lung was negative. The right border of cardiac dulness was about 2 cm. to the right of the sternum, but the left border could not be distinguished because it was lost in the diffuse flatness

of the left chest. The heart sounds were rapid, regular, and only slightly muffled. The abdomen was uniformly distended, tender, and rigid.

Course. The physical signs and the roentgen films were suggestive of considerable fluid in the left chest pushing the heart to the right. Aspiration at the angle of the left scapula produced pus. Under general anesthesia airtight intercostal drainage was instituted by insertion of a tube, the other end of which was placed under water. However, only 250 c.c. of pus were recovered at operation, and the total drainage per day did not exceed that amount. The next day a pneumonic process was found in the right lower lobe posteriorly and five days later 100 c.c. of thin grayish-green pus



A B

FIG. 1A AND 1B. The patient, fifteen months after operation. The scar in the pericardial region indicates the site of the pericardial operative incision. The posterior scars are the sites of the empyema incisions.

were aspirated from this region. It was thought that there was no need for haste in evacuating this empyema by operation because the pus was thin and the left pleural cavity had already been opened. Cultures of the pus from both pleural cavities produced pneumococcus Type II.

The possibility of suppurative pericarditis was considered by me on the day following admission but the presence of pneumonia and bilateral empyema seemed sufficient to account for the child's marked illness. He continued to grow progressively worse, cyanosis, dyspnea, fever, rapid pulse and abdominal distention being almost constantly present. Three days after admission signs of an acute left otitis media appeared but required no operation. The pulse, which was regular on admission, became irregular.

The persistence of cardiovascular embarrassment and extreme toxemia led me to investigate the pericardium as the possible source of acute disease with the result that one week after admission, aspiration of the pericardial sac was done in the fourth interspace close to the left border of the sternum. The needle was directed beneath the sternum and as nearly parallel to the under-surface of it as possible. Greenish pus was obtained which was thicker than that found in the pleural cavities.

Operation. On his seventh day in the hospital, January 12th, pericardiotomy was performed under general anesthesia. A curved incision was made in the pericardial region down to the ribs. Three-quarter inch sections of the cartilages of the fourth and fifth ribs were removed close





FIG. 2 FIG. 3

FIG. 2. On admission the roentgen picture showed a wide shadow involving the entire left chest and encroaching upon the right chest. The heart shadow and the left pleural shadow are confluent.

FIG. 3. Immediately after left thoracotomy the pleural shadow became clearer, revealing a large pericardial shadow.

to the sternum. The internal mammary vessels were ligated at the upper and lower limits of the incision. No pleura was seen in this area. Apparently the enlarged pericardial sac had pushed away the parietal pleura to a safe distance. The pericardial sac was again aspirated and pus obtained. A section of thickened parietal pericardium was then removed in the region of the excised rib cartilages, making an opening into the pericardial sac about three-quarters of an inch in diameter. Pus poured from the pericardial sac rhythmically with each heart beat. At first the heart could not be seen, but as most of the pus was evacuated, a shaggy fibrin-covered pericardium appeared. The heart was then plainly visible displacing a small amount of pus in each diastole. The total amount of pus recovered was approximately 120 c.c. An attempt was made to mar-

supialize the pericardial sac but the parietal pericardium was too thick and tough. Instead, it was sutured to the subcutaneous tissues in order to maintain an orifice for good drainage. A blunt probe was passed over the anterior surface of the heart in order to determine whether there were any adhesions between visceral and parietal pericardium, but none were encountered. A rubber dam drain was placed down to, but not into, the pericardial sac, and the skin and subcutaneous tissues were held open as widely as possible by means of iodiformized gauze packing. Culture of the pus showed pneumococcus Type II.

There was an immediate improvement in the child's condition. Although the respirations and pulse rate continued to be rapid, the dyspnea and cyanosis were greatly improved and the fever which had ranged between 103°F. and 104°F. fell to 101°F. On the day following the operation there was a recurrence of all the symptoms which existed before the pericardiotomy, but on January 14th he appeared to be somewhat stronger. A first dressing was done. The rubber dam was removed. The visceral pericardium, which was shaggy with fibrin at the time of pericardiotomy, was now quite smooth though still grayish in color. In the pericardial wound there were only a few drops of pus which were pushed forward with the action of the heart. The wound itself had diminished to approximately one-third its original size. A probe was passed over the anterior surface of the heart and no adhesions were encountered. The infection of the pericardium seemed to be receding but new complications arose.

The signs of fluid in the right chest became more pronounced and thick pus was aspirated at the angle of the scapula. A thoracotomy was performed on January 19th in this area, with resection of about two inches of the eighth rib. A well localized empyema was found containing approximately 180 c.c. of pus. After evacuation, packing was introduced into the cavity mainly to stabilize the lung which moved vigorously with respiration. This empyema cavity closed rapidly. Soon after, January 29th, a pneumothorax with a bronchial fistula developed on the left side. The left lung became completely collapsed and added considerably to his dyspnea. All the methods used failed to cause the lung to expand. Continuous drainage of the left pleural cavity was maintained throughout his stay at the hospital since air accumulated under pressure in the pleural cavity when the thoracotomy wound closed. Finally, signs of cardiac failure appeared. Presacral edema was noted early in the course of the illness but on February 2nd, the edema spread to the legs. The liver edge was felt about 5 cm. below the costal margin. The urinary output was markedly diminished and at times there was suppression of urine. There was a skipping of the radial pulse which corresponded to respiration. Salyrgan 0.5 gm. and caffeine citrate 0.2 gm. were administered and were followed by improvement in the edema as well as in the general condition of the patient. Concomitantly there was a considerable increase in the urinary

output from 180 c.c. a day to 1000 c.c. The liver remained large. The reason for the edema was at first problematic; pericardial adhesions, interference with blood supply through the vena cava and heart failure were considered as probable factors. He was seen on February 18th by Dr. B. S. Oppenheimer who noted that "there is still a large liver and a pulsus paradoxicus but no edema of the legs. My impression is that there is a general cardiac failure which accounted for the large liver and for the edema, rather than a mechanical difficulty resulting from the previous displacement and adhesions of the heart or from the narrowing of the inferior vena cava due to adhesions. It hardly seems possible that in so short a time concretio cordis should have developed. Since my impression is of heart failure and not inherent pericardium causing enlarged liver and



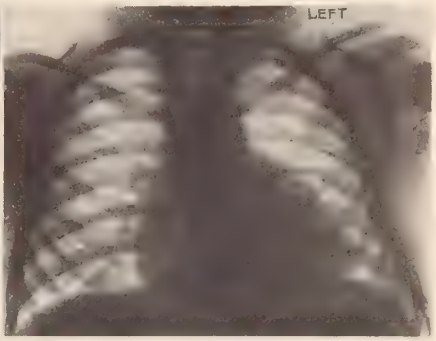


FIG. 4 FIG. 5

FIG. 4. There is a left pneumothorax with the injected lipiodol resting at the bottom of it. In the right chest the pericardial shadow is still far over to the right.

FIG. 5. The pericardial shadow is shown in this picture (taken ten months after operation) in normal position although still larger than normal. The left lung has expanded fully. The scattered darkened areas represent globules of lipiodol.

edema I should suggest digitalis and occasional doses of salyrgan in addition to the oxygen chamber. Our adult cases of concretio cordis have all showed increased venous pressure and cyanosis. The child's condition in any case would not warrant any operation to relieve adhesions or pericardiotomy."

The following day it was observed that the problem was no longer one of infection but was related to cardiac failure and lessened pulmonary ventilation due to collapsed left lung. There was no purulent discharge from either pleural cavity or from the pericardium. The pericardial wound was clean and granulating. Beginning with February 22nd, the oxygen tent to which the patient had been confined was removed, at first for about one hour. The period of time was gradually increased and at the end of two weeks the tent was dispensed with. As the patient's condition grad-

ually improved, the liver slowly decreased in size. Clubbing of the fingers appeared. About fourteen weeks after admission the patient was able to walk and two weeks later he was discharged from the hospital. At this time his condition was excellent when he was at rest, but on comparatively slight exertion he became dyspneic and cyanotic and his pulse became rapid. An electrocardiogram, taken on January 11th, showed changes as seen in cases of myocardial involvement or pericardial effusion, but when repeated on March 12th, there were no changes except that the T1 and T2 were semi-inverted. He showed no emaciation. His disposition was jolly although he had been quite irritable during the course of his illness.

Follow-up Examination. Although the patient seemed to continue to improve, roentgenologic examination showed the pneumothorax in the left chest to have increased to such an extent as to push the heart well over to the right side. This was noted seven months after operation. A needle was introduced into the pleural cavity and air under great pressure was allowed to bubble out under water. Even after the tense pneumothorax was relieved, air continued to flow with each expiration. This was apparently due to a small bronchial fistula. Dr. H. Hennell suggested introducing lipiodol into the pleural cavity with a view to closing the fistula by causing a productive pleuritis. This was accomplished, and in a few days the fistula had closed. The lung gradually expanded, and the pneumothorax, which for seven months had been slowly increasing in size and tenseness, disappeared and ten months after operation the left lung was well aerated. The child gained a great deal of weight. He was able to indulge in ordinary physical exercise without dyspnea. No cyanosis was present and his pulse was normal. There was nothing to indicate the possibility of adherent visceral and parietal pericardium.

SUMMARY

Acute purulent pericarditis is rarely diagnosed clinically and more rarely operated upon. In the case described, the diagnosis was obscured by the presence of pneumonia and bilateral empyema thoracis. When the pneumonia had subsided and the patient continued to be quite sick, the possible diagnosis of a purulent pericarditis presented itself. With pericardiotomy the pus was easily evacuated, but convalescence was protracted because of a right empyema, left pneumothorax, and cardiac failure. At follow-up examination eleven months after the operation, the child was free of symptoms.

Thanks are due to Dr. B. S. Denzer of the Pediatric Service for his tireless postoperative medical attention in this case.

ACQUIRED GIANT AIR CYSTS OF THE LUNG

With Special Reference to Their Pathogenesis and Pneumodynamics

HERMAN HENNELL, M.D.

[*From the Thoracic Group and the Medical Service of Dr. B. S. Oppenheimer*]

This is the report of a case of acquired air cysts of the lung in a woman, 38 years old, with a history of asthmatic bronchitis associated with suppurative sinusitis extending over a period of seventeen years. It is of interest because of the diagnostic difficulties it presented and because of the light it sheds on the pathogenesis and pneumodynamics of the condition.

CASE REPORT

History (Adm. 384417). The patient was admitted to The Mount Sinai Hospital on September 12, 1935 with chronic productive cough and dyspnea as prominent symptoms. She gave a history of typical intermittent attacks of asthmatic bronchitis extending over a period of seventeen years. These attacks were especially frequent and severe during the winter months and were occasionally associated with a moderate rise in temperature. During the summer months rhinitis, conjunctivitis and paroxysmal sneezing were common. Because of frequent upper respiratory infections, a radical sinus operation was performed at the age of seventeen; tonsillectomy and polypectomy were done at thirty years of age. These operations gave her little relief; moreover the attacks of asthmatic bronchitis increased in frequency and severity. Four years before admission the patient began to experience pain in the left chest on coughing or deep breathing and occasionally became aware of crackling sounds in her left lower chest when performing certain stretching movements. One year before admission roentgen ray examination in another institution disclosed changes which were interpreted as a localized pneumothorax in the left chest. Because of the persistence of these chest findings the patient was referred one year later to The Mount Sinai Hospital for study and treatment.

Examination. On admission the patient was dyspneic and somewhat cyanotic but did not appear very ill. The chest was of the emphysematous type; the lungs were hyperresonant throughout. In the left axilla and left anterior lower chest the breath sounds were faint; elsewhere the breath sounds were prolonged and higher pitched. A moderate number of

sibilant and sonorous râles were heard throughout. The cardiac impulse was palpable at the xiphoid process, suggesting considerable displacement of the heart to the right. There was moderate tachycardia but no other significant cardiac abnormality. The blood pressure was 120 systolic and 80 diastolic. There was evidence of an old bilateral spheno-ethmoidectomy and intranasal antrotomy. Irrigation of the sinuses yielded moderate amounts of mucopus from the sphenoids and antra.

Laboratory Findings. Hemoglobin, 98 per cent; white blood cells, 12,800 with polymorphonuclears, 78 per cent; lymphocytes, 20 per cent; monocytes, 2 per cent.

The sputum was mucopurulent and showed no tubercle bacilli. Culture of the mucopus obtained from the sinus washings revealed Staphylococcus



FIG. 1. Roentgenogram made on admission showing two large circumscribed collections of air in the left lung which displace the heart to the right and the diaphragm downward.

aureus and Streptococcus viridans. The Wassermann test and urinalysis were negative.

The venous pressure was 5.5 cm. of water; saccharin time, 12 seconds; ether time, 4 seconds, and the vital capacity 1500 c.c. The electrocardiogram showed sinus tachycardia, low voltage of the QRS complexes in leads II and III with high voltage in lead I. Sensitization tests were positive for ragweed and a number of foods.

Roentgen ray examination of the chest showed the presence of two large circumscribed collections of air in the anterior portion of the left lung (Fig. 1). The heart was markedly displaced to the right. The left leaf of the diaphragm was displaced downward. There was evidence of bilateral mediastinal adhesions.

The roentgen ray appearance of the lungs and some of the clinical features of the case were more suggestive of giant air cysts in the left lung than of localized pneumothorax. Additional studies were carried out to establish this diagnosis.

Bronchographic examination with the aid of iodized oil was done in order to determine the status of the bronchial tree. The bronchogram showed marked backward displacement and crowding together of the left lower lobe bronchi. The upper lobe bronchi were displaced upward and backward. The general position of the bronchi conformed more or less to the outline of the collections of air, thus indicating that the latter were intra-



FIG. 2. Roentgenogram made after the injection of iodized oil into the upper air cyst. Some of the iodized oil found its way into the lower air cyst. Both cysts are well outlined by the radio-opaque oil.

pulmonary air cysts. There was no abnormality of the lumen of the bronchial tree. No oil entered the air cysts.

An artificial pneumothorax was then induced on the left side. The initial intrapleural pressure reading was 12 cm. of water on inspiration and 4 cm. of water on expiration. After 300 c.c. of air were injected into the pleural cavity, the readings were minus 8 and 0 respectively. Simultaneous with the rapid change in the intrapleural pressures the patient began to experience severe chest pain which was acute for the first two hours and lasted for more than two days. These findings were interpreted as being indicative of extensive pleural adhesions. This was confirmed by roentgen

ray examination which showed pocketing of the injected air in the posterior portion of the left pleural cavity. Roentgenoscopic examination in various positions showed no air in the anterior portion of the pleural cavity. The air cysts were plastered to the anterior chest wall by adhesions.

An attempt was then made to determine the pressure within these intrapulmonary collections of air. This proved a simple procedure inasmuch as their superficial and anterior localization had been determined by previous roentgen ray examination. The pressure readings in the cyst were plus 10 cm. of water on normal inspiration and plus 2 cm. of water on deep inspiration. The pressures on expiration were plus 17 and plus 22 cm. of water, respectively.

In order to determine with greater precision the outline of these air collections, apparently giant air cysts of the lung, about 5 c.c. of iodized oil were introduced into the upper cysts and immediate roentgen ray examinations were made with the patient in various positions. Some of the iodized oil found its way into the lower air cysts and thus both cysts were outlined roentgenologically (Fig. 2).

Course. Following the injection of the iodized oil, an exudate appeared in both cysts. A few days later the temperature rose to 101.8°F. Signs of bronchopneumonia at both bases developed and were confirmed by roentgen ray examination. Three days later the temperature declined to normal and clinical improvement progressed rapidly. Within a week the physical signs of bronchopneumonia disappeared and roentgen ray examination showed resolution of the process, but the exudate in the cysts persisted.

On October 17, 1935 the patient was well enough to be discharged. She was to be followed in the Out-Patient Department where her allergic and sinus conditions would receive appropriate treatment.

COMMENT

The patient was admitted to the hospital with a diagnosis of chronic localized pneumothorax of over one year's duration. A comparison of the roentgenograms obtained on admission with those made one year earlier showed little or no change in the size or shape of the air collections in the left lung. On both occasions the films showed marked displacement of the heart and the mediastinal structures to the right suggesting considerable tension within these collections of air. While such a localized tense pneumothorax could cause these changes, nevertheless it could not remain without alteration in size and configuration over a period of one year or more unless it were constantly renewed through a bronchopleural communication. For otherwise its size decreases as the air is absorbed. The fact that the lung markings could be seen over the cyst suggested also that the air collections were intrapulmonary rather than pleural. Another observation which seemed to support the diagnosis of "giant air cysts of the lung" in contradistinction to "localized pneumothorax" was that during inspira-

tion the air collections would enlarge and diminish during expiration, as seen on roentgenoscopic examination. In the case of localized pneumothorax the air pocket is smaller in inspiration and larger in expiration.

Bronchography revealed a distortion of the bronchial tree of the left lung which could be caused only by an expansive lesion in the lung itself. The failure of the iodized oil to enter the air cysts suggested that bronchial communication was quite tortuous.

Roentgen ray examination after the establishment of a pneumothorax showed further that the cysts were intrapulmonary and that they were firmly adherent to the anterior chest wall. This latter circumstance was of considerable clinical importance for two reasons: (a) it prevented the rupture of the cysts; (b) it precluded their further and excessive enlarge-



FIG. 3. Roentgenogram made after subsidence of the reaction which followed the injection of iodized oil. It shows the air cysts considerably decreased in size.

ment, thus preventing undue embarrassment to the patient, who had few symptoms referable to the cysts.

The measurement of the intracystic pressures with the aid of a water manometer proved most instructive in elucidating the pneumodynamics involved. It was found that the intracystic pressure was markedly positive and that it varied greatly during inspiration and expiration. It should also be recalled that the appearance of the cysts showed little or no change in one year. These features suggested that a check valve type of communication existed between the air cysts and the bronchial tree. With this type of communication the development of the cysts to giant size, their persistence, their high intracystic pressure, and their ability to distort the bronchi and displace mediastinal structures can easily be understood.

As was pointed out in another publication (1), the size, growth and dynamics of an air cyst are determined largely by the character of its bronchial communication. When this communication is free, allowing ingress and egress of air during inspiration and expiration respectively, the air cyst will remain of small size or enlarge very slowly. The intracystic pressure being more or less atmospheric, it is not likely to produce marked distortion of the bronchi or displacement of the intrathoracic structures.

When the bronchial communication of the air cyst is in the nature of a check-valve, allowing air to enter the cyst during inspiration (when pressure conditions are favorable) but preventing its egress during expiration, the cyst will tend to enlarge and will quickly reach "giant" proportions. Because of the high intracystic pressure it will distort the bronchial tree and displace intrathoracic structures, as was seen in this case. However, its further growth is automatically checked by the following factors: The development of positive pressure within the cyst during the inspiratory phase will prevent further ingress of air, converting it temporarily into a closed space. As some of the air in the cyst is absorbed and the intracystic pressure falls below atmospheric, air can again enter the cyst during inspiration. The opening and closing of the bronchial communication during the inspiratory phase is automatically controlled by the intracystic pressure, thus checking unlimited growth of the cyst after it has reached optimal size.

The other two influences which oppose undue enlargement of the giant air cysts are: (a) pleural adhesions and (b) the elastic resistance of the functioning pulmonary parenchyma. The manner in which pleural adhesions by anchoring the air cysts interpose resistance to their further enlargement is obvious. The importance of the elastic resistance offered by the functioning pulmonary parenchyma to the expanding air cysts is readily appreciated if it is recalled that the development of air cysts in pulmonary tissue is made possible when aplasia or destruction of pulmonary parenchyma takes place, resulting in the loss of elastic support for the remaining alveoli (1). In the normally functioning lung excessive distention of an alveolus during inspiration is prevented by the elastic resistance of its wall and, particularly, by that of the neighboring alveoli which are being distended simultaneously. When aplasia or destruction of pulmonary parenchyma occurs, this elastic resistance to the distention of the remaining alveoli is impaired and the foundation is laid for such abnormal developments as air cysts. The greater the destruction or aplasia, the larger will be the cysts which develop. These will cease to enlarge when their intracystic pressure is balanced by the elastic resistance of the surrounding pulmonary parenchyma. In this connection the recently published experimental work of Moolten (2) on the mechanical production of cavities in isolated lungs is of great interest. By producing lacerations in the

fibro-elastic framework of the lung parenchyma he was able, by mechanically inflating the injured lungs, to reproduce defects simulating emphysematous bullae and air cysts. His conclusion was that when in the functioning lung infiltration with necrosis resulted in gross loss of pulmonary tissue, the remaining alveoli are required to support the entire force of inspiration and coughing, and because of their weakened state, they are readily dilated into large, round, emphysematous bullae or air cysts.

As to the pathogenesis of the pulmonary process in the case under discussion, it seems quite certain that the giant air cysts in the left lung were not of congenital origin since they were not seen in the roentgenograms made seven and five years earlier in another institution, where the patient had been studied over a period of many years. The condition is, therefore, acquired and its probable evolution may be summed up as follows: As a result of recurring pulmonary infection incidental to the suppurative sinusitis and asthmatic bronchitis over a period of seventeen years, there occurred destruction of considerable alveolar tissue. The remaining adjacent alveoli and alveolar passages were deprived of their former elastic support. Lacking this support, the intra-alveolar pressure, especially during coughing and paroxysmal dyspnea, exerted a distending influence which was progressive and resulted in air cyst formation. As these air cysts grew, slowly at first, their bronchial communication became more and more tortuous and finally developed into the check-valve type. When this occurred, rapid growth of the cysts followed until they reached their present giant size. The mechanism by which they reached their optimal size has already been discussed.

In considering the treatment of this patient, it must be recalled that the giant air cysts in the lung appeared to have little influence on her symptoms and, therefore, presented no serious therapeutic problem. The suppurative sinusitis and asthmatic bronchitis were responsible for the patient's complaints and these will receive appropriate treatment in the allergy and sinus clinics.

It might be added, however, that as a result of one of the diagnostic procedures employed the air cysts may become obliterated. It will be recalled that following the injection of iodized oil into the cysts an exudative reaction of considerable extent developed. It appears that the inflammatory reaction within the cysts may have led to obliteration of their bronchial communication which was obviously quite tortuous. As a result of this, the air content of the cysts has shown a marked tendency to decrease by absorption and the cysts may eventually collapse altogether. Such an instance has recently been reported (3), and serial films in our own case (Fig. 3) suggest such a possibility.

REFERENCES

(1) Hennell, H.: Arch. Int. Med. 57: 1, 1936.
(2) Moolten, S. E.: Arch. Path. 19: 825, 1935.
(3) Crosswell, C. V., and King, J. C.: J. A. M. A. 101: 832, 1933.

THE OCCURRENCE OF TOXIC HEPATITIS IN PERNICIOUS ANEMIA TREATED WITH LIVER EXTRACT

ROBERT C. ELITZIK, M.B., Ch.B.

[*Medical Service of Dr. George Baehr*]

Seven cases of toxic hepatitis complicating pernicious anemia have been observed on the wards of The Mount Sinai Hospital since April 1935. All of the seven patients had been treated with liver extract in the Out-Patient Department. It seems that the association of the hepatitis and the pernicious anemia is more than coincidental.

The following case demonstrates the essential clinical and laboratory features of this group and is also of interest because of the appearance of transient glycosuria during the icterus.

CASE REPORT

History (Adm. 386004). The patient, a 45 year old Russian born tailor, was first admitted to the medical ward of The Mount Sinai Hospital on June 16, 1934. He complained of progressive weakness and frequency of micturition of five months' duration. At the time of admission his weakness was so severe that he could scarcely stand. He gave no history of paresthesias or of sore tongue.

Examination. He was well nourished but pale and appeared chronically ill. The tongue was smooth. The spleen and liver were not palpable. The superficial and deep reflexes were equal and active. There was questionable impairment of position sense in the toes.

Laboratory Data. The red blood cells numbered 2,420,000; hemoglobin, 48 per cent; color index, 1; white blood cells, 7,000; polymorphonuclear leucocytes, 75 per cent; lymphocytes, 25 per cent; reticulocytes, less than 0.5 per cent. The red blood cells showed moderate anisocytosis and poikilocytosis; a few macrocytes were present. Icteric index, 11. Van den Bergh: direct, negative; indirect, 1 to 500,000, i.e., 0.2 mg. of bilirubin per cent. Blood cholesterol, 235 mg. per cent, and the ester fraction, 70 mg. per cent. A Rehfuss test meal showed complete anacidity after histamine.

Course. The diagnosis of pernicious anemia was made, and the patient was given 2 c.c. of liver extract intramuscularly, at first daily and then every other day. During the first week, he developed signs of marked spinal cord involvement. There was absolute loss of position sense in the legs and complete loss of bladder control. Other signs of cord involvement

were: hypo-active deep reflexes of the lower extremities, bilateral Babinski sign, absent lower abdominal and cremasteric reflexes, ataxia, and loss of posterior column sensation in the lower extremities.

In addition to the injections of liver extract, ventriculin, brewer's yeast, and reduced iron were given by mouth. His blood picture improved remarkably. At the time of discharge from the hospital, August 16th, his hemoglobin was 85 per cent, and there were 4,430,000 red blood cells per cu.mm. His general condition had also improved, but the neurological status remained unchanged. The final diagnosis was pernicious anemia and postero-lateral degeneration of the spinal cord with paralysis of the bladder.

Interval History. He entered the Montefiore Hospital one week later, remaining there for 22 weeks. He received 12 c.c. of liver extract intramuscularly weekly. On discharge from that hospital in February 1935, his hemoglobin was 86 per cent. His bladder control had improved, and he could walk with the aid of a cane. After discharge, he attended the Out-Patient Department of this hospital where he received 3 c.c. of liver extract intramuscularly once weekly until his last admission in October. The patient's diet during this time was poor. He usually ate only one meal a day. In March 1935 he had a fistula-in-ano excised in this hospital. Six weeks before his last admission (October 25, 1935), he began to experience colicky pains in the lower abdomen. Jaundice was first noticed by his physician two weeks later. The icterus was progressive.

Second Admission. The patient was fairly well nourished. Skin and sclerae were icteric. There was slight atrophy at the tongue edges. The lungs and heart were negative. The abdomen was soft and protuberant. The liver edge was just palpable, smooth, soft, and slightly tender. The spleen was enlarged to one finger below the costal margin, smooth and soft. The deep reflexes were equal and hyperactive; abdominals were absent. The Babinski sign was present bilaterally. There was slight impairment of the vibratory sense of the right leg and foot.

Laboratory Data. The blood pressure was 110 systolic and 60 diastolic; red blood cells, 6,250,000; hemoglobin, 85 per cent; platelets, 210,000; white blood cells, 7,800; polymorphonuclear leucocytes, 71 per cent; eosinophils, 8 per cent; basophils, 1 per cent; lymphocytes, 17 per cent; monocytes, 3 per cent; reticulocytes, less than 0.5 per cent. There was 3 plus bile in the urine, but no urobilin, albumin or sugar. The blood Wassermann was negative. The blood urea nitrogen was 16 mg. per cent; total proteins, 6.7 per cent; cholesterol, 405 mg. per cent with an ester of 100 mg. per cent; sugar, 110 mg. per cent. The icteric index, 65 (acetone method, −40 (1)). Van den Bergh: direct, prompt positive; indirect, 1 to 40,000, i.e., 2.5 mg. bilirubin per cent. Duodenal drainage: slightly yellow, numerous leucocytes, no crystals. Stool: light brown color, urobilin present; guaiac, negative.

A galactose tolerance test showed an excretion of 7.3 gm. The sodium benzoate test (Quick (2)) resulted in less than 0.99 gm. of hippuric acid excreted in four hours (normal: 3 3.5 gm.). The blood was negative for tyrosine.

An X-ray examination of the abdomen revealed no radio-opaque calculi.

Course. Toxic hepatitis was diagnosed. The patient was placed on a high carbohydrate diet including liver. For several weeks his general condition remained unchanged. The intensity of the jaundice varied slightly. The cholesterol total and ester remained at about 400 and 100 mg. per cent, respectively (see table).

TABLE

DATE	CHOLESTEROL*			URINE		BILIRUBIN			GLUCOSE TOLERANCE (JANNEY TEST)
	Total	Ester	Free	Urobilin	Bile	Icteric Index	Van den Bergh		
							Direct	Indirect	
10–7 (OPD)	300	80	220			75	pr.pos.	1:40,000	
10–26	405	100	305	0	+++	65 (a27)			
10–31	410	110	300	1:5	tr.	75 (40)			
11–6				1:10	+	90			
11–11				1:5	0				165, (g), 270, 370, 440
11–18	355	150	205			75 (20)			150, (g), 280, 345, 270, 190, 110, 145, 135
11–20									125, (g), 110, 145, 135, 130
11–23						50 (18)			
11–25	260	105	155	1:10	0	32 (11)	del.pos.	1:60,000	

* Epstein (3).

After the first week in the hospital, a small amount of sugar was found in the urine. This increased gradually, and at the end of the second week his glycosuria rose as high as 115 gm. for 24 hours. There was never acetonuria. A Janney test performed at this time (November 11) showed decreased sugar tolerance. One week later, both the icterus and the glycosuria began to recede. A second Janney test (November 18) showed increased dextrose tolerance. At the time of discharge, December 1, 1935, the icterus had entirely disappeared. On a diet of 400 gm. carbohydrate, 100 gm. protein, 40 gm. fat, the patient did not show glycosuria. He was symptom-free except for a slight persistent ataxia.

Since his discharge from the hospital, the patient has been attending the Out-Patient Department, receiving 6 c.c. of liver extract weekly, with no recurrence of the icterus.

COMMENT

The diagnosis of toxic hepatitis was made on the basis of the icterus, the palpable, tender liver and spleen, the negative X-ray findings, and the liver function tests.

Eppinger (4) states that "every case of jaundice with a sudden onset lasting one to several weeks, and giving a favorable prognosis, should be included in the group of 'icterus catarrhalis,' provided that the diagnosis of cholelithiasis can be excluded." Our seven cases satisfy Eppinger's criteria for so-called catarrhal jaundice.

The underlying pathology of so-called catarrhal jaundice is still in the process of clarification. Virchow's (5) theory of catarrhal obstruction of the common bile duct as the mechanism which caused the jaundice was first criticized by Heitler (6), Flindt (7), and Pal (8). These authors described the pathology of catarrhal icterus as a degeneration of the liver parenchyma. Naunyn (9) believed that catarrhal icterus was due to a cholangeolitis, i.e., a non-suppurative inflammatory lesion of the finer bile passages with destructive influence upon the liver parenchyma, which he termed "cholangie." Klemperer, Killian, and Heyd (10) follow Eppinger in considering catarrhal icterus as neither a morbid nor a pathological entity. They classified cases of catarrhal icterus as: (a) icterus due to obstruction of the common bile duct following gastro-intestinal catarrh; (b) icterus due to degeneration and multiple areas of necrosis of the liver; (c) icterus due to cholangitis.

The modern tendency is to consider catarrhal jaundice as a parenchymal degeneration of the liver due to some undetermined toxin (Blumer (11), Symmers (12), Okell (13), Findlay and Dunlop (14), Wallgren (15), Gaskell (16)), i.e., a toxic hepatitis or a toxic hepatosis.

The etiological factors for the toxic hepatitis have not been established. The seven patients had received liver extract intramuscularly in the Out-Patient Department. The liver extract, made exclusively by Wilson & Co., was investigated for impurities which might account for the hepatic damage. The results were negative for arsenic, foreign proteins, and histamine. The novocain (U. S. P.) used in the injection of the extract was found to be free of impurities. The distilled water used in diluting the novocain was reported as slightly positive for arsenic by the chemistry laboratory. This was not considered significant. An intradermal test of the extract for hypersensitivity was done on one patient (Adm. 382135) but was negative.

It is well known that where there has been malnutrition and a decrease in the glycogen content of the liver, there is greater tendency to liver degeneration. These patients were all unemployed; their relatively poor diets might have been a predisposing cause of the liver damage.

Only one of the seven patients had any evidence of past liver damage. Although a luetic (Adm. 382737), she made an uneventful recovery from the hepatitis; the liver remained hard and coarsely lobulated. The absence of

clinical evidence of previous liver damage in six of the cases eliminates the possibility that the anemia was a macrocytic anemia complicating a chronic hepatitis (17).

The impairment of dextrose tolerance in the case reported presents an interesting metabolic problem. There was nothing to suggest diabetes mellitus nor pancreatic dysfunction. The glycosuria appeared during the icterus and disappeared after return of normal hepatic function. The sugar disturbance must be considered of hepatic origin. Lande and Pollack (18) have reported three cases of biliary tract disease with impaired liver function, accompanied by hyperglycemia and glycosuria. After restoration of hepatic function, the dextrose tolerance steadily improved.

The fault seems to lie in impairment of glycogen storage in the liver. Soskin and his co-workers (19) have shown experimentally that liverless animals with the pancreas intact yielded uniformly and markedly "diabetic" tolerance curves. Soskin concludes that the "presence of the normal liver is essential to the metabolic reactions which determine the normal dextrose tolerance curve."

Insulin was not used to control the hyperglycemia in this case for several reasons. Hepatic glycosuria is often insulin-resistant. Paradoxically, patients with hepatic glycosuria may be particularly susceptible to insulin shock (18). This may be explained by the low fasting sugar level that is often present.

It is interesting that in many cases of true diabetes mellitus associated with pernicious anemia, insulin does not reduce the blood sugar, perhaps because of the presence of anemic anoxemia (20).

REFERENCES

(1) Ernst, Z., and Förster, J.: Klin. Wchnschr. 3: 2386, 1924.
(2) Quick, A. J.: Am. J. M. Sc. 183: 630, 1933.
(3) Epstein, E. Z.: Arch. Int. Med. 47: 82, 1931.
(4) Eppinger, H.: Spec. Path. u. Therap. inn. Krankh. 6(2): 97, 1923.
(5) Virchow, R.: Virchows Arch. f. path. Anat. 32: 117, 1864.
(6) Heitler, M.: Wien. med. Wchnschr. 37: 957, 1887.
(7) Flindt, N.: Biblioth. f. Laeger 1: 420, 1890 (quoted by Wallgren (15)).
(8) Pal, J.: Wien. klin. Wchnschr. 7: 19, 1894.
(9) Naunyn, B.: Quoted by Baehr, G., and Klemperer, P.: Internat. Clin., 39th Series, 2: 107, 1929.
(10) Klemperer, P., Killian, J. A., and Heyd, C. G.: Arch. Path. 2: 631, 1926.
(11) Blumer, G.: J. A. M. A. 81: 353, 1923.
(12) Symmers, D.: J. A. M. A. 74: 1153, 1920.
(13) Okell, C. C.: Tr. Roy. Soc. Trop. Med. & Hyg. 25: 26, 1931.
(14) Findlay, G. M., and Dunlop, J. L.: Brit. M. J. 1: 652, 1932.
(15) Wallgren, A.: Acta Paediat. 9 (Suppl. 2): 1, 1930.
(16) Gaskell, J. F.: J. Path. & Bact. 36: 257, 1933.
(17) Wintrobe, M. M., and Shumaker, H. S., Jr.: Bull. Johns Hopkins Hosp. 52: 387, 1933.
(18) Lande, H., and Pollack, H.: Arch. Int. Med. 56: 1097, 1935.
(19) Soskin, S., and Mirsky, I. A.: Am. J. Physiol. 112: 649, 1935.
Soskin, S., Allweiss, M. D., and Cohn, D. J.: Am. J. Physiol. 109: 155, 1934.
(20) Adams, S. F.: Med. Clin. North America 8: 1163, 1924–25.

THE ORIGIN, DEVELOPMENT, AND PRESENT ACTIVITIES OF THE GYNECOLOGICAL ENDOCRINE RESEARCH DIVISION

ROBERT T. FRANK, M.D.

This review of the origin, development, and present activities of the Endocrine Research Laboratory of The Mount Sinai Hospital is given at the request of the editor of this Journal. It is realized that frequently the activities going on in one portion of a hospital are not known to, and are not followed by, members of the staff on other services. Therefore, the editor's request is gladly acceded to.

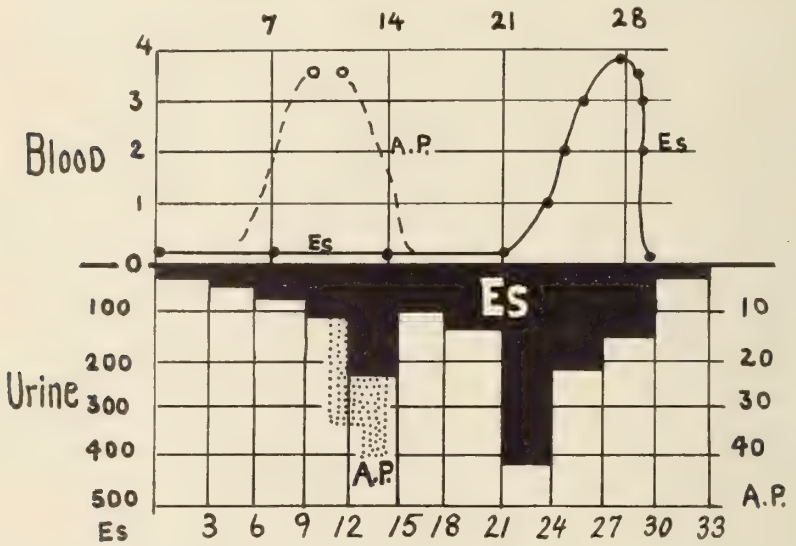
Origin. In 1925 I returned, after an absence of eight years, to The Mount Sinai Hospital. Just before leaving Denver our group there, working at Denver University (Gustavson and Weyerts) and at the National Jewish Sanatorium for Consumptives (Frank and Frank), demonstrated the presence in the circulation of the female sex hormone or estrogenic factor, as it is now more often called (1). This discovery, which for the first time demonstrated by direct evidence the presence of a hormone in the blood stream, was made simultaneously and independently by ourselves as well as by Dr. Sigmund Loewe (2), then in Dorpat, Esthonia, but now for the past two years at The Mount Sinai Hospital.

From 1925 to 1934 the facilities at our disposal consisted of a small room next door to the Chemistry Laboratory. Iceboxes, centrifuges, vacuum, etc. were available only through the courtesy of the Department of Chemistry. Our warm gratitude is thus due to Drs. Heidelberger and Sobotka for their constant kindness in allowing us to use their equipment for nine years.

Estrogenic Blood Test. The first problem in our work at The Mount Sinai Hospital was to devise a clinical method by means of which the presence or absence of the estrogenic factor could be determined in the human female, both qualitatively and quantitatively. Within a short time a comparatively simple clinical method, since then further simplified and improved, was developed, which is generally known as the Frank-Goldberger blood test (3) and which is used in many institutions in various parts of the world.

By means of the blood test it was noted that the normal, cyclical, menstruating female has a definite blood cycle recurring each month, an increasing amount of estrogenic factor circulating in the blood until the time of menstruation, at which time it rapidly diminishes and disappears (Graph 1). After determining the *norm*, a large number of women complaining of various functional conditions were studied. Striking deviations from the

normal were observed in amenorrheas, the gravity of the amenorrhea depending on the amount and regularity of the secretion of the estrogenic factor (4). In individuals with malformations, such as absent vagina or pseudohermaphroditism, in whom the sex was doubtful, the cyclical occurrence of the estrogenic factor was utilized to establish the feminine sex (5) (Graph II). In spite of the fact that an estrogenic reaction is occasionally obtained in normal males (6), the absence of cyclical waves in the male offers a reliable differentiation between the sexes. However, when no cyclical reaction is found, the sex must remain questionable. In



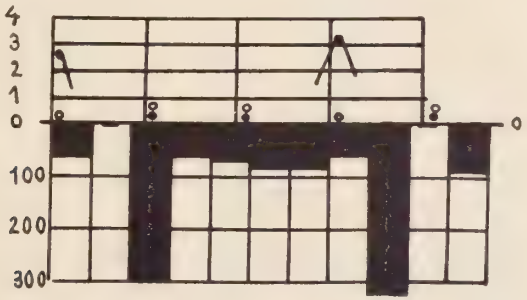
Graph I. Prepituitary and estrogenic cycle in the blood and urine of a normal woman. Above base line, *blood* cycle; vertical lines every 7th day. Below base line, *urine* cycle; vertical lines every 3rd day. A.P. = anterior pituitary reaction. Es. = estrogenic reaction. 100–500, at left, signifies number of mouse units of Es. excreted in 3 days. 10–40, at right, signifies number of rat units of A.P. excreted in 3 days.

a series of over 30 cases, only 3 showed absence of the cyclical variations and consequently only in these three did the sex remain undetermined. The test, in this application, is of medico-legal value.

Our further studies showed that after the eighth week of pregnancy, the estrogenic factor in the blood stream remains permanently high (7). If the fetus dies, the estrogenic factor disappears from the blood stream within twenty-four hours. Consequently viability of the fetus after the eighth week is likewise determinable by our test (8). This application of the test has proved of value in many clinically doubtful situations, for example, such as protracted bleeding during pregnancy, in order to decide whether the fetus is dead and whether active intervention is indicated.

Although our working space was small and assistance limited to one full-time technician, a large number of other problems were taken up. This was possible because of the enthusiasm and valuable assistance of Dr. Morris A. Goldberger, his wife, Dr. Gertrude Felshin Goldberger, and Dr. Frank Spielman. At this time the distribution of the estrogenic factor in the plant and animal kingdom was investigated. It was found present in yeast, various edible plants, fish ova, and in the placentae of many species including the camel, beaver, cow, sow, sheep, dog, cat, guinea pig (material was generously supplied by Dr. Nobak of the Bronx Zoological Gardens). The factor was also found present in the ordinary foods—potato, meat, milk, butter, eggs, etc.

Estrogenic Urine Test. During this same period studies on the excretion in the urine and feces were begun. An automatically working extraction method, permitting 0.5 liter of chloroform to run automatically through a urine specimen for ten hours, was developed. At present the entire urinary



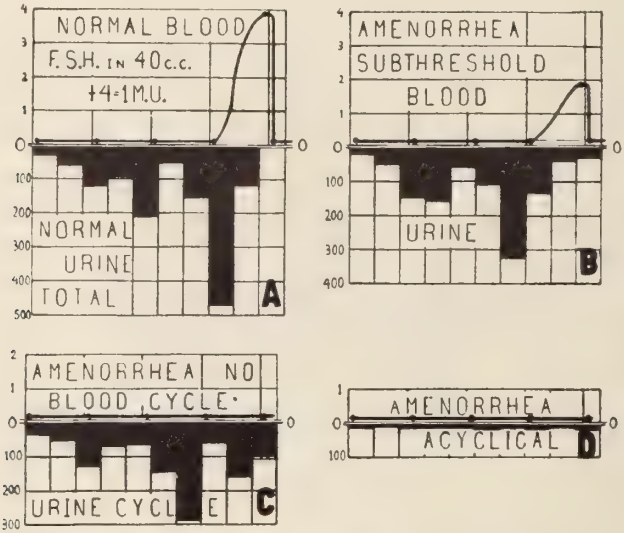
Graph II. Absent vagina: 21-day Es. blood cycle; normal urine cycle. (From J. A. M. A. 103: 393, 1934.)

output over one month can be extracted, preparatory to assay, in ten hours (Fig. 10). The urine studies proved of great clinical significance and by a combination of the blood and urine studies, the estrogenic cycle in the normal female could be fully determined. Subsequently the differences noted in both underfunction and overfunction of the ovaries were studied in groups of patients (9). Studies to determine the fate of the hormone when injected into the blood stream from which it promptly disappears (10), as well as attempts to elucidate the seemingly variable kidney threshold during the cycle (11), also were made, but the results obtained are subject to several interpretations, and hence are indecisive.

An attempt was made to check up the observation that tumor tissue (adenoma of the breast, fibroids of the uterus (11a, 11b)) may contain large amounts of estrogenic substance. We found large amounts of estrogenic substance in muscle depots (psoas muscle), a fact which renders the direct relationship of carcinogenesis to high estrogenic values very

doubtful. It also throws an interesting sidelight upon the storage and utilization of hormones within the body.

In underfunctional conditions which include not only amenorrhea but also endocrine sterilities and many varieties of dysmenorrheas, it was found that the blood and urine cycles might continue in diminished amounts (subthreshold) but yet retain a cyclical regularity. In others only a urine cycle was found; still others were acyclical (Graph III). The variations in amount of female sex hormone is an important guide to an accurate prognosis. Many years of follow-up of these patients have fully confirmed these observations.



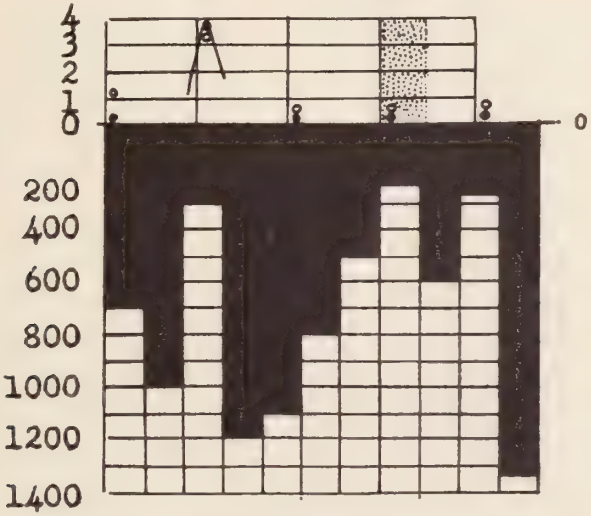
Graph III. Occurrence of estrogenic substance in the blood and urine of normal and amenorrheic women: A, normal; B, subthreshold; C, negative blood cycle, positive urine cycle; D, acyclic. (From J. A. M. A. 97: 1852, 1931.)

In the over functional group, which is subject to excessive uterine bleeding, it was noted that no abnormal blood changes need occur, that sometimes the hormone did not accumulate in the blood, but that in the vast majority of cases an almost continuous overexcretion through the urine took place (Graph IV). A similarity in the hormonal condition of excessive puberty bleeding and that of preclimacteric hemorrhage became apparent (12). It was also noted that continuously high blood hormone with diminished urinary excretion, unaccompanied by excessive bleeding, occurred in a group now generally known as "premenstrual tension" (13). In this group severe neuro-vascular symptoms, psychical tension and unrest dominate the clinical picture (Graph V).

The majority of these observations have been published separately, and also summarized, first in a monograph, "The Female Sex Hormone"

(14), which embodied the contents of a series of lectures (the first Bacon Lecture, Chicago, 1929), later in my Harvey Lecture in 1930 (15) and recently as part of a symposium appearing in the Journal of The American Medical Association, 1935 (16).

Prepituitary Factors. Although I had already realized for many years (1917) that the hypo- or hyper-ovarian functional changes which are of interest to the clinician, must be secondary to other endocrine disturbances (17), it was not until the epoch-making discovery of Aschheim and Zondek (18) and Philip Smith (19), which proved the dominance of the prepituitary gland, that my attention was particularly focused upon this organ of internal secretion.

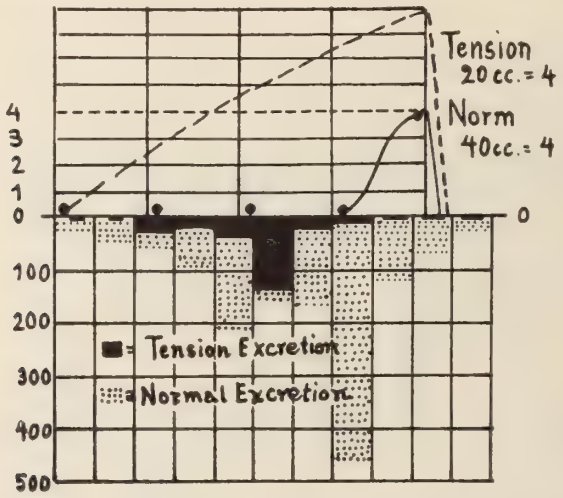


GRAPH IV. Menorrhagia. Cycle showing marked overexcretion (7,425 mouse units). (From J. A. M. A. 103: 393, 1934.)

From 1928 on many individual studies of pregnancy were made by us, first by means of the Aschheim-Zondek test (20), later with the Friedman test (21), some for purely research purposes, the majority in connection with direct clinical problems. Today the pregnancy tests, particularly the Friedman test, are so universally used that no description of them is needed. Up to the present we have made 2000 tests, most of them for the clinical determination of pregnancy, but a considerable number in connection with involved or obscure diagnoses such as hydatid mole, chorionepithelioma in both male and female, testicular teratoid tumors, adrenal tumors (21), etc., in which quantitative assay is essential. It was found that in some cases of normal pregnancy as little as 0.075 c.c. of urine may give a positive rabbit reaction.

Prepituitary Blood Tests. Since 1931 the study of the prepituitary has

been one of the larger activities of the laboratory. No difficulty was encountered by any investigators in determining the increase of the prepituitary factor in the blood and urine during pregnancy, as the quantitative increase during gestation is so huge. Our studies, however, were directed toward elaborating methods for studying the prepituitary factor in the normal, non-pregnant female in which only minutest quantities of the gonadotropic hypophyseal hormones are present in the circulation. The first method, published in 1931 (23), though crude, had already shown a definite blood cycle, and later on, by means of the Zondek concentration test (24), as well as by the Katzman-Doisy technique, the follicle stimu-



Graph V. Contrasting "premenstrual tension" and normal function. Normal estrogenic substance in blood shown by solid line; "tension" estrogenic substance in broken line. Tension shows increased estrogenic substance in blood. Decreased excretion 300 mouse units (solid blocks) compared to that of normal female (1,500 mouse units). (From J. A. M. A. 103: 393, 1934.)

lating prepituitary factor could likewise be determined in the urine, 1934 (25).

In May 1934 a new, enlarged and fully equipped laboratory was placed at our disposal. It contains large and small centrifuges, a mechanical shaking machine, hoods and evaporating exhaust equipment, ice box with freezing compartments, automatic set-up for simultaneous extraction of eleven urines, incubators for embedding sections, microtome, etc (Fig. 2).

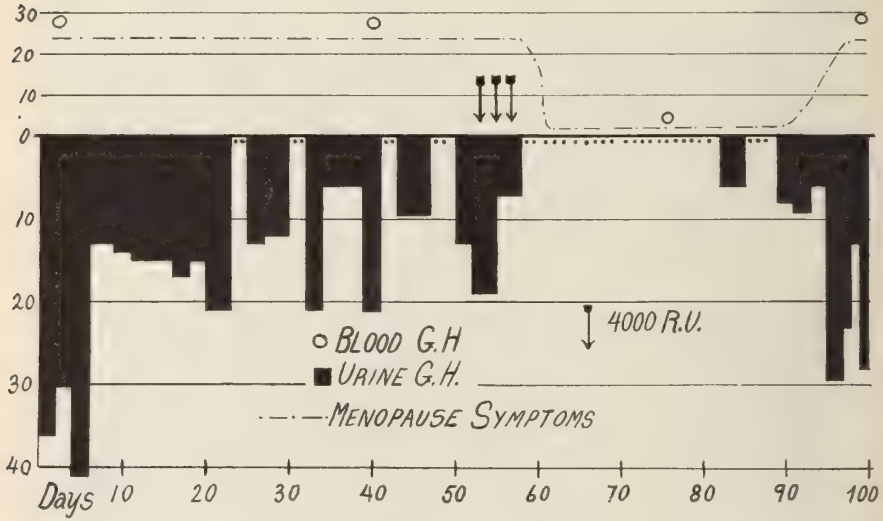
In February 1934, Dr. U. J. Salmon joined our group as the Joseph Brettauer Research Fellow. His studies have been focused upon the gonadotropic prepituitary hormones.

Now by accurate, laborious and intensive studies, new methods have been developed by means of which accurate and more delicate readings of



FIG. 1. Battery of automatic chloroform extractors for urine.
FIG. 2. Work bench in the Laboratory of Gynecological Endocrine Research.

the gonadotropic factors are obtained. The blood and urine cycle of the non-pregnant female has been thoroughly investigated (Graph I). It was discovered that both follicle stimulating and luteinizing reactions are present in the blood and urine (26). Following this, women suffering with functional menstrual disturbances were studied (as yet unpublished). Particular attention has been paid recently to the menopause, and the hormonal changes in the menopause have been investigated (27). Our methods yield objective criteria as to the hormonal changes and permit the study of the effect of therapy, independent of the subjective symptoms or testimony of the patient (Graph VI). This has enabled us to note that



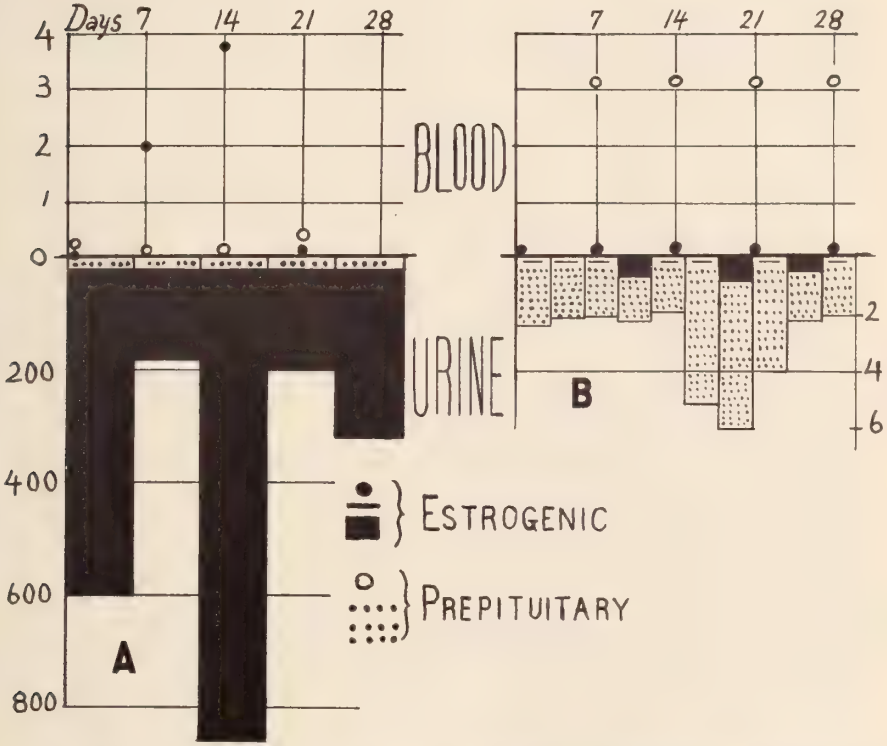
GRAPH VI. Spontaneous menopause. Continuous study for 130 days (only 100 days shown on graph). Preliminary study (55 days) showing continuous over-excretion of gonadotropic factors (G.H.) in blood and urine. After injection of 12,000 rat units of Progynon B, the G.H. disappeared from blood and urine and symptoms (flashes) did not recur for 30 days.

as in experimental animals, injection of sufficient estrogenic substance (for example, 25,000 R. U. of Progynon B) reduces the preponderance and excessive secretion and excretion of the prepituitary gonadotropic factors. Hence, an accurate basis for the dosage can be worked out in each individual patient.

By the simultaneous study of both gonadotropic and estrogenic factors, it has become apparent that there are at least two types of amenorrhea, both ascribable to disturbance of the prepituitary. The one type resembles that of individuals in the menopause in that excessive secretion and excretion of the gonadotropic prepituitary factors occur with little or no estrogenic production; the other, with no excess of, or with marked

reduction of gonadotropic factor, usually with or without coincident absence of estrogenic hormone (Graph VII). This is of extreme clinical importance as the indications for therapy, at least in theory, appear to be diametrically different in the two groups.

At present two teams are working coordinately in the laboratory. The one, under the direction of Dr. Morris A. Goldberger, is concentrating on the estrogenic factor (technician, Mr. Arthur Vatmann); the other, under



GRAPH VII. Estrogenic and prepituitary secretion and excretion in amenorrhea. A: Never menstruated. G.H. in blood and urine not demonstrable. Normal blood and urine cycle (excreted 2,100 M.U. Es). B: Amenorrhea 4 years. G.H. persistently high in blood and urine. Blood negative for Es., minimal excretion of Es. (95 M.U.). (Unpublished.)

Dr. U. J. Salmon (now Hiram N. Vineberg Research Fellow), on the prepituitary factors (technician, Miss Rose L. Berman). Recently Dr. Emanuel Klempner joined the laboratory staff as the Joseph Brettauer Research Fellow.

At present 80 per cent of our laboratory activities are occupied with routine hospital work. Constantly the Private Pavilion, Semi-Private Pavilion, Consultation Service, physicians engaged in private practice,

gynecological, surgical and medical wards, as well as the Out-Patient Department, request help in clarifying obscure conditions. Not only female but also male patients are being studied. Two male castrates (as yet unpublished) have been investigated. A biological classification of ovarian tumors is under way. Pituitary, adrenal and pelvic tumors (whenever available) are assayed. There is no dearth of material or leads. On the contrary, we are more often hampered by an "embarras de richesse." This is largely due to the active interest, helpful cooperation, and hearty support given by all the services of the hospital. They inform us of the presence of patients suffering from unusual conditions and afford us unhampered opportunity to pursue our investigations. For this privilege we are very grateful.

REFERENCES

(1) Frank, R. T., Frank, M. L., Gustavson, R. G., and Weyerts, W. W.: J. A. M. A. 85: 510, 1925.
(2) Loewe, S.: Klin. Wchnschr. 4: 1407, 1925.
(3) Frank, R. T., and Goldberger, M. A.: J. A. M. A. 87: 1719, 1926.
(4) Frank, R. T., and Goldberger, M. A.: J. A. M. A. 90: 106, 1928.
Frank, R. T., and Goldberger, M. A.: New York State J. Med. 29: 671, 1929.
Frank, R. T.: J. A. M. A. 97: 1852, 1931.
(5) Frank, R. T., and Goldberger, M. A.: J. A. M. A. 87: 554, 1926.
(6) Frank, R. T., Goldberger, M. A., and McGee, L. C.: Am. J. Obst. & Gynec. 16: 387, 1928.
Frank, R. T., and Goldberger, M. A.: Proc. Soc. Exper. Biol. & Med. 25: 476, 1928.
(7) Frank, R. T.: Am. J. Obst. & Gynec. 12: 585, 1926.
(8) Frank, R. T., and Goldberger, M. A.: J. A. M. A. 90: 106, 1928.
Spielman, F., Goldberger, M. A., and Frank, R. T.: J. A. M. A. 101: 266, 1933.
(9) Frank, R. T., and Goldberger, M. A.: J. A. M. A. 94: 1197, 1930.
(10) Frank, R. T., Goldberger, M. A., and Spielman, F.: Proc. Soc. Exp. Biol. & Med. 19: 1229, 1932.
(11) Frank, R. T., and Goldberger, M. A.: Proc. 2nd Internat. Congress for Sex Research, 1930, p. 378.
(11a) Lewis, D., and Geschickter, C. F.: J. A. M. A. 103: 1212, 1934.
(11b) Lewis, D., and Geschickter, C. F.: J. A. M. A. 104: 45, 1935.
(12) Frank, R. T., Goldberger, M. A., and Spielman, F.: J. A. M. A. 103: 393, 1934.
(13) Frank, R. T.: Arch. Neurol. & Psychiat. 26: 1053, 1931.
(14) Frank, R. T.: The Female Sex Hormone. Charles C. Thomas, Springfield, Ill., 1929.
(15) Frank, R. T.: The Female Sex Hormone. Harvey Lectures, 1930–1931, p. 29.
(16) Frank, R. T.: Chapter in Glandular Physiology and Therapy. American Medical Association, Chicago, 1935. Also, J. A. M. A. 104: 1991, 1935.
(17) Frank, R. T.: Surg., Gynec. & Obst. 25: 225, 1917.
(18) Zondek, B., and Aschheim, S.: Arch. f. Gynäk. 130: 1, 1927.
(19) Smith, P. E.: Am. J. Physiol. 80: 114, 1927.
(20) Frank, R. T., Goldberger, M. A., and Felshin, G.: J. Lab. & Clin. Med., 17: 61, 1931.

(21) Goldberger, M. A., Salmon, U. J., and Frank, R. T.: J. A. M. A. 103: 1210, 1934.
(22) Frank, R. T.: Proc. Soc. Exp. Biol. & Med. 31: 1204, 1934.
(23) Frank, R. T., Goldberger, M. A., and Spielman, F.: Proc. Soc. Exp. Biol. & Med. 28: 999, 1931.
(24) Frank, R. T.: J. A. M. A. 97: 1852, 1931.
(25) Katzman, P. A., and Doisy, E. A.: J. Biol. Chem. 106: 125, 1934.
(26) Frank, R. T., and Salmon, U. J.: Proc. Soc. Exp. Biol. & Med. 32: 1237, 1935.
(27) Frank, R. T., Salmon, U. J., and Friedman, R.: Proc. Soc. Exp. Biol. & Med. 32: 1666, 1935.
Frank, R. T., and Salmon, U. J.: Proc. Soc. Exp. Biol. & Med. 33: 311, 1935.
Salmon, U. J., and Frank, R. T.: Proc. Soc. Exp. Biol. & Med. 33: 612, 1936.

CLINICAL PATHOLOGICAL CONFERENCES

GEORGE BAEHR, M.D., AND PAUL KLEMPERER, M.D., *presiding*

Wednesday, November 27, 1935

Case 1. Mitral stenosis, auricular fibrillation and hypertension with congestive heart failure (From the Medical Service of Dr. George Baehr)

History (Adm. 386615). The patient was an Italian woman, 47 years of age, who 25 years ago was said to have had "rheumatism." For the past five years she was known to have an elevated blood pressure of over 200 systolic. It was noted by physicians who attended her that at times she had auricular fibrillation. Occasionally she had periods of mild decompensation with dyspnea and orthopnea requiring rest in bed. The last of such episodes preceding her present illness occurred one year ago. Following this she was comparatively well for nine months. Three months before entering the hospital there developed a non-productive cough, nocturnal dyspnea, increasing orthopnea, discomfort in the right upper quadrant and swelling of both lower extremities. Because of these symptoms she was compelled to remain in bed during these three months. On the day preceding her admission to the hospital her symptoms became worse and cyanosis appeared.

Examination. The patient was highly excited, had marked cyanosis and was gasping for breath. The neck veins were distended and pulsated irregularly. There was slight dulness at both bases and moist râles were audible throughout both lungs. The heart was moderately enlarged. Its sounds were forceful although totally irregular. The apex rate was 160 and the pulse rate 120, making a pulse deficit of 40. No murmurs were heard. The blood pressure was 290 systolic and 150 diastolic. Tenderness was present over the liver. There was pitting edema of the lower extremities. The clinical impression in this instance was that the substratum for congestive failure was hypertensive heart disease with coronary arteriosclerosis and auricular fibrillation.

Course. The patient was given morphine and atropine. This was followed by a phlebotomy of 600 c.c. of blood. Oxygen therapy was instituted and tourniquets were applied to the extremities. In spite of these measures and other supportive therapy, she died in pulmonary edema two hours after admission.

Post Mortem Findings. At necropsy, performed two hours after death, there was present marked cyanosis of the face, neck, mucous membranes and finger tips. There was marked edema of both lower extremities. The abdomen was distended due to the presence in the peritoneal cavity of over two liters of fluid.

The heart was markedly enlarged and weighed 650 gm. The left auricle was markedly dilated and its wall moderately thickened. The endocardium was thickened, wrinkled and grayish-white in color. There was marked narrowing of the mitral ostium. The leaflets of the mitral valve were thickened, rigid and fused. The edges of the valve were rounded, rolled under and showed on the auricular

surface of the closure line several small, firm, tawny-colored elevations. The chordae tendinae were thickened, fused and inserted behind the rolled free edge of the mitral valve. The thickened valve edge hung over the rigid chordae as a shelf. The left ventricle was enormously hypertrophied and dilated. In the line of the outflow tract of this chamber, the septal endocardium was thickened and whitened. There was thickening of the aortic cusps and within the substance of this valve there were several atherosclerotic plaques. The right auricle was hypertrophied and widely dilated. The free edge of the tricuspid valve was thickened and the caudae tendinae inserting into it were thickened and fused. The right ventricle was hypertrophied and dilated and the coronary arteries showed subintimal yellow plaques without, however, any encroachment on their lumina. While the chronic endocarditis of the mitral tricuspid and aortic valves was considered to be rheumatic in origin, the marked hypertrophy of the left ventricle could be attributed only to the independent presence of hypertension for several years.

The other findings included pulmonary edema, passive congestion of the viscera, and a horse-shoe kidney.

Comment. The difficulty in making an accurate clinical diagnosis of the valvular lesions in this case because of the coexisting congestive heart failure with auricular fibrillation and especially because of the absence of audible murmurs was stressed by Dr. Baehr. He referred to the vague history of rheumatism as being the only available clue to the presence of rheumatic heart disease.

Dr. Oppenheimer pointed out that this case illustrated the fact that patients with rheumatic heart disease who live to the fourth and fifth decades may develop hypertension with its sequelae as an independent condition.

Case. 2. Chronic gastritis with hepatosplenomegaly due to recurring hepatitis and a clinical picture of "Coeliac Disease." Terminal acute ulcerative colitis (From the Surgical Service of Dr. Harold Neuhof)

History (Adm. 382576). The patient was a fourteen year old boy who was first admitted to the hospital on August 9, 1934. He was apparently well until the age of five years when he developed measles and a respiratory infection which lasted several weeks. After this illness he remained weak, undersized and underweight. It was soon discovered that his liver was greatly enlarged. At the age of eight years he began to have diarrhea. At first the diarrhea consisted of ten to twelve watery bowel movements, but this subsided gradually so that about one year ago there were only about four to five loose stools per day. They were foamy and usually rather bulky. Associated with this there was persistent anorexia, frequent epigastric burning and postprandial discomfort. For two and a half years there were multiple sores over the extremities and trunk, described as red painful indurations in the skin which broke down and discharged small amounts of "pus". For some time the patient also noticed ecchymoses on the slightest trauma.

One year before his first admission to the hospital, the patient was studied on the Consultation Service. Here it was discovered that he had a secondary anemia, the hemoglobin being 52 per cent. The other blood findings were normal. The stool showed no fat crystals but contained 20 per cent fat in dried matter. Barium enema and sigmoidoscopic examinations disclosed no significant findings. Fluoroscopy of the stomach with the aid of barium showed the gastric rugae to be thickened and prominent. A Rehfuss test-meal revealed an almost constant anacidity.

After histamine only a small amount of free hydrochloric acid was secreted. At the Consultation Service it was thought that the patient had suffered a severe infection following measles at the age of five, which had damaged his liver and pancreas. The frequent bulky stools which were free of occult blood and rich in fat were thought to be due to pancreatic insufficiency. The arrested development was believed to be the expression of hepatic or pancreatic dwarfism. Splenomegaly was interpreted as due to cirrhosis of the liver.

For a time the boy improved on a high carbohydrate and low fat diet together with large doses of iron and liver extract. Then he began to lose weight and felt weak and was therefore admitted to the hospital.

Examination. The boy was thin, underdeveloped, but symmetrically proportioned. His size was that of a boy of 8 or 9 years of age. His color was distinctly pale and he appeared chronically ill. There was a soft blowing systolic murmur over the apex of the heart. The blood pressure was 86 systolic and 50 diastolic. The abdomen was distended. The liver was found to be enlarged to 4 fingerbreadths below the right costal margin. The spleen was palpable about 2 fingerbreadths down. The penis was small and the testicles were incompletely descended. Slight pitting edema was present over the tibiae. There was moderate clubbing of the toes but not of the fingers. Numerous flat, depigmented, atrophic areas varying in size from a dime to a half-dollar were scattered over the arms, trunks, and especially over the legs.

The significant laboratory findings were: hemoglobin, 82 per cent (Sahli); blood cholesterol, 440 mg. per 100 c.c. and cholesterol ester, 290 mg. per 100 c.c.; blood protein, 4.5 per cent with albumin, 2.8 per cent and globulin, 1.7 per cent; blood calcium, 8.5 mg.; phosphorus, 4.1 mg. per 100 c.c.; basal metabolic rate, minus 4 per cent.

The impression of the clinicians, which coincided with that of the Consultation Service a year before, was that the boy was suffering from chronic pancreatic insufficiency on the basis of chronic pancreatitis, causing diarrhea and infantilism. The enlargement of the liver was interpreted as probably due to an associated cirrhosis.

Course. Under observation the boy was alert and seemed to feel quite well. He was put on a so-called "diet for coeliac disease" and was discharged after fifteen days to be observed by his physician at home.

Second Admission. The patient remained well for a year after discharge from the hospital until several days before his second admission. While at a summer camp, he began to complain of headache and loss of appetite. He again developed diarrhea, the stools being brown in color but unusually not foul smelling.

Examination. The physical findings were essentially similar to those found on his previous admission. On this occasion, however, he was febrile, his temperature ranging from 100° to 103.6°F. The stools now contained occult blood for the first time.

Course. It was believed that the patient now developed an ulcerative colitis. On the second day in the hospital, while straining at stool, he developed severe pain in the right lower quadrant associated with spasticity and marked local tenderness over this area. It was believed that he had peritonitis due to a small perforation in the bowel. An exploratory operation was performed; no perforation or any evidence of peritonitis were found.

Following the operation the patient developed a gradually increasing distention and frequent vomiting. In spite of enemata, irrigations, the administration of pituitrin and continuous venoclysis, he declined rapidly and died on the fifth post-operative day with the temperature rising to 107.5°F.

Post Mortem Findings. The most significant lesions were in the gastro-intestinal tract. The stomach was the seat of a huge polypoid gastritis. Its mucosa was enormously thickened and the rugae were thrown up into large mammillations, 1½ cm. high and 1 cm. in diameter. The caecum showed acute necrotic patches within chronically inflamed areas. The mucous membrane of the colon was markedly thickened and had a granular, pink-gray appearance. There were many small punched-out ulcers with black bases scattered over the surface. The small intestine was markedly distended due to an obstructive omental band at the ileo-cecal junction. The liver was enlarged and firm, as was the spleen. The splenic vessels were normal. Microscopic sections of the stomach showed marked hyperplastic gastritis with an excessive increase in the mucus-secreting cells. The colon was found to be the seat of chronic inflammation with superimposed acute ulcerative lesions. In the small vessels of the intestine old thrombotic lesions were noted. These were apparently the result of the absorption of toxic products from the intestine. The liver showed chronic hepatitis and fibrosis without destruction or reorganization of lobular architecture. The spleen was found to be enlarged, due solely to chronic inflammatory changes. The pancreas was free of disease.

Comment. In commenting on the differential diagnosis of this condition, Dr. Baehr pointed out that Gaucher's disease was ruled out by the absence of a family history and by the normal roentgenograms of the long bones. It was thought that persistent absence of albuminuria ruled out amyloidosis as the cause of the hepato-splenomegaly. He thought the low blood protein was due to an inability to assimilate protein because of hyperperistalsis. The lowered blood calcium was attributed to the fact that the fats were not digested or absorbed but reached the colon as insoluble calcium soaps. In this manner enough calcium was eliminated to reflect itself ultimately in a lowering of the calcium content of the blood.

The colitis could not have been present throughout the course of the disease, for the stools had not contained any blood. It must, therefore, be regarded as a terminal phenomenon. The primary disturbance must have been the chronic gastritis and this was responsible for the intestinal disturbances with the consequent malnutrition, anemia and arrested development. The splenomegaly was due to portal stasis in a cirrhotic liver, the seat of recurring attacks of hepatitis.

Dr. Klemperer emphasized the impossibility of giving the chronological order of the lesions or presenting an accurate correlation of the pathological findings with the clinical facts. In view of the non-conformity of this colitis with the usual ulcerative form and because of the fact that polypoid gastritis is not known to complicate a pre-existing ulcerative colitis, he believed it probable that the gastric lesion antedated the disease in the colon. The finding of blood in the stool only late in the illness, he felt, strengthened this contention. The etiology of the hepatomegaly remains in doubt. Although chronic hepatitis may follow an infection such as scarlet fever, it is not known to follow measles. It would be difficult on clinical grounds alone to attribute the chronic inflammation of the liver to drainage of toxic material from the gastro-intestinal tract, since the liver enlargement was discovered before the development of gastro-intestinal symptoms and signs.

Dr. Haas suggested that this condition was originally coeliac disease in spite of the fact that it did not begin until the patient was five years of age. The ulcerative symptoms in the colon and stomach, he believed, were of later origin.

Dr. Crohn did not agree that this was a case of classic coeliac disease. It was his belief that the disease of the stomach was enough to account for the original symptoms. The lack of hydrochloric acid had allowed for secondary infection of the gastro-intestinal tract, resulting in this instance in a fatal colitis. The original lesion, in his opinion, was congenital gastritis.

Reported by Frederick H. King, M.D.

Wednesday, December 11, 1935

Case 1. Polycythemia vera (From the Medical Service of Dr. B. S. Oppenheimer)

History (Adm. 386976). The patient, a fifty-three year old man, entered the hospital with a one-day history of black vomitus and tarry stools. In 1920 the patient had a tooth extracted. The operative site bled for more than one day. Two years later (1922) he visited a physician because of gaseous eructations and pyrosis and was told that he had an enlarged spleen and clubbed fingers. In 1923 he experienced numbness of his left upper extremity and one week later developed a complete left-sided hemiplegia. The diagnoses of polycythemia vera and cerebral thrombosis were made, and he was hospitalized for a period of three months. Following this illness he received X-ray therapy, remained rather weak, and experienced some dyspnea on exertion. In 1934 the patient developed painful swellings of both legs, ankles and left great toe. This subsided within a week, however. Two months before admission he experienced a sudden severe attack of left upper quadrant pain for which he was again hospitalized for one week and treated with X-ray. There was a similar episode two weeks ago. The night prior to admission he passed a tarry stool, and on the morning of admission he vomited coffee-ground material.

Examination. The patient appeared chronically ill, plethoric, and in moderate shock. There was cyanosis of the lips and slight exophthalmos. The palms were brick red and the fingers moderately clubbed. There was a positive von Graefe sign and engorgement of the veins of the fundus oculi. The tongue was beefy red. The chest was markedly emphysematous and the heart enlarged to the left of the midclavicular line. Heart sounds were of poor quality. The blood pressure was 114 systolic and 90 diastolic. The liver edge was firm and palpable four finger-breadths below the costal margin. The huge hard spleen filled the entire left upper quadrant and its edge extended to a point two finger-breadths below the umbilical level and slightly to the right of the midline. The skin over the malar region showed many spider-web telangiectases. Neurological examination revealed slight left facial and left motor weakness.

In spite of the severe bleeding from the gastro-intestinal tract, the blood hemoglobin was still 100 per cent and red blood cells totalled 7,350,000. There were 280,000 platelets, 59,000 white blood cells of which 93 per cent were polymorphonuclear leucocytes and 7 per cent myelocytes. The bleeding time was 3 minutes, the clotting time 14 minutes. The blood Wassermann test was negative, the blood urea 56 mg., uric acid 4.5 mg., and creatinin 2.5 mg. per 100 c.c. The stool guaiac test was strongly positive. The diagnoses entertained were polycythemia vera with

splenic vein thrombosis, residual right cerebral thrombosis, bleeding from a duodenal ulcer or, possibly, esophageal varices.

Course. During the first two days of hospitalization the patient continued to have melena, lost his plethoric appearance and developed air hunger. His hemoglobin fell to 77 per cent, blood pressure to 92 systolic and 70 diastolic, and the blood urea rose to 74 mg. per 100 c.c. The elevation of blood urea nitrogen was attributed to the state of profound shock since kidney function remained good. During the following three days he was given three transfusions and intravenous sodium citrate. There was temporary and slight improvement with disappearance of signs of shock. Five days after admission there was a continuous ooze of tarry reddish stools and signs of a basal bronchopneumonia developed. The picture of shock soon supervened. The patient died in this state, five days after admission and eighteen years after the splenic enlargement had first been noted.

Post Mortem Findings. At necropsy a striking hyperemia of all organs was seen. The spleen was firm, markedly enlarged and weighed 2150 gm. (about 15 times normal size). The capsule was irregularly thickened. The cut surface was smooth, moist and bulged considerably above the surface. The follicles could be recognized. The splenic artery and vein were clear. The liver was moderately enlarged and on section showed a distinct widening of the gray periportal areas. The kidneys were slightly enlarged and presented scattered, cortical, irregular, gray-yellow, pea-sized areas. The bone marrow was pink-gray and soggy. The duodenal mucosa showed an oval, punched-out deep ulcer, 1.0 by 0.5 cm., the edges of which were blood-tinged. There were two other oval, shallow mucosal ulcerations, 0.5 cm. in diameter, in the distal portion of the first part of the duodenum.

Comment. Dr. Klemperer pointed out that in most instances of polycythemia vera the erythrocytic and megakaryocytic elements are hyperplastic. With the exception of cases of thrombocytemia, the bone marrow in polycythemia vera shows a greater increase of megakaryocytes than in any other disease. The spleen in the case presented showed a diffuse myeloid hyperplasia of the type seen in leukemia, and the bone marrow a marked general cellular proliferation. From an anatomical viewpoint, therefore, this case seemed to represent a transition from polycythemia to leukemia.

There are leukemias in which evidence of both erythropoietic and myelocytic proliferation are present, and on this basis, therefore, polcythemia vera and leukemia seem to be related. Dr. Klemperer referred to another instance of polycythemia vera which showed a predominant proliferation of reticulum cells within the spleen which because of their multipotency could in turn progress either along leucopoietic or erythropoietic lines. This may account for the pronounced leucocytosis characteristically present in polycythemia vera.

If the leucopoesis becomes exaggerated, it may ultimately produce the clinical and pathological picture of leukemia.

Dr. Baehr reëmphasized the fact that secondary polycythemia is always due to poor oxygen exchange, usually of pulmonary origin. It was his opinion that even polycythemia vera in many instances represents a response, an over-compensation for an obscure disturbance in oxygen-carrying capacity. He observed a case of polycythemia vera some years ago in which the etiological agent was believed to be chronic carbon monoxide poisoning. The patient, who was a clothing presser, had used a slowly leaking gas iron for many years. Since acute carbon monoxide (il-

luminating gas) poisoning may be followed temporarily by a pronounced polycythemia, Dr. Baehr, therefore, thought it conceivable that the same mechanism acting over a longer period of time could produce a fixed polycythemia vera. In spite of the fact that the patient had discontinued this type of work and carbon monoxide hemoglobin could no longer be found in his blood, the patient's signs and symptoms of polycythemia persisted. Apparently when once established, the hyperplasia of the medullary and extramedullary foci may persist. The clubbing of the fingers which had been present for twelve years in this case, in the opinion of Dr. Baehr, lends support to the hypothesis that some interference with the normal oxygen exchange of the red cells existed in this man and gave rise to the picture of polycythemia vera.

Dr. B. S. Oppenheimer: "This case leads one to consider again a probable relationship between duodenal ulcer and polycythemia. In 1929 I collected a group of seven cases of polycythemia vera with vascular occlusion in the brain, coronary arteries, hepatic veins, or vessels of the extremities. One of these patients, who at the age of 38 suffered from an attack of acute coronary artery occlusion, subsequently had a large hemorrhage from a gastric ulcer. Since then Professor William Boyd has published a case of polycythemia, duodenal ulcer and coronary thrombosis. This recalls the observations of Dr. G. Friedman who described seventeen cases of polycythemia complicated by duodenal ulcer. It is difficult to tell whether all were real polycythemia vera cases. Since other authors, such as Bing, Schneider, and Parkes-Weber and Watson, have noted the association of peptic ulcer and polycythemia, there is probably some causal relationship. Boyd suggested that in polycythemia vera the local lesion is originally vascular in origin, and that the peptic ulcer then results from the injurious effect of the gastric juice on this area of local necrosis or diminished vitality."

Reported by Henry Horn, M.D.

Wednesday, December 18, 1935

Case 1. Gangrenous appendicitis with perforation; gastric hemorrhage from acute ulcers (From the Surgical Service of Dr. Edwin Beer)

History (Adm. 387369). The patient was a twelve year old girl who, two days before admission, began to complain of mild pain in the right lower quadrant. During the night the child was awakened by generalized cramp-like abdominal pain which persisted throughout the night. This was accompanied by vomiting. A laxative followed by an enema were non-productive of stool. On the following day, the pain was still felt all over the abdomen but chiefly in the right lower quadrant. The temperature rose to 102°F. The abdominal pain continued and was accompanied by a chill and rise of temperature to 103°F. A physician was called, and the patient was referred to the hospital.

Examination. The patient appeared acutely ill and was perspiring profusely. The temperature was 103.2°F. The abdomen was distended. There was rigidity, tenderness and rebound tenderness all over the abdomen. This was most marked, however, in the right lower quadrant. On rectal examination, fulness was detected in the cul-de-sac. The blood count showed 23,200 white blood cells of which 94 per cent were polymorphonuclear leucocytes.

Course. The impression was that the child had acute diffuse peritonitis sec-

ondary to acute appendicitis with perforation. An abdominal puncture in the left lower quadrant yielded turbid fluid containing gram-positive cocci and gram-negative bacilli. It was felt that operation was contra-indicated at this time and that an opportunity should be given for localization of the peritoneal exudate. The patient was put in Fowler's position. She was given nothing by mouth, and a Levin tube was inserted at intervals. She was also given morphine and a continuous venocylsis of glucose and saline. During the next four days her temperature, which at first rose to 106.6°F., dropped slowly to 101.6°F., and her condition seemed to improve. During this period she had frequent loose stools, due probably to the pericolonic exudate which was felt on rectal examination. On the fifth day there was a sudden change following a warm rectal irrigation. She began to vomit, and a Levin tube was made indwelling. Abdominal distention developed and could not be relieved by spinal anesthesia. The day after the Levin tube was inserted she began to bleed through the tube, and the latter was removed. She then vomited bright red blood. This ceased after a transfusion. Despite all supportive measures, the patient became progressively worse. Signs of bilateral bronchopneumonia appeared; the temperature rose to 101°F., and she died on the ninth day in the hospital.

Post Mortem Findings. The abdominal cavity contained about 3 liters of thick, yellow fluid, having a fecal odor. This fluid was found to be both free in the abdominal cavity and collected in small locules formed by light adhesions between bowel, mesentery and omentum. The proximal 2½ cm. of the appendix presented a pale, grayish serosal surface. The middle 1½ cm. was adherent on one surface to the cecum. The opposite surface was plastered over by a soft, buttery plaque of exudate which fell off on exposure of the appendix, revealing a large defect in the wall from which several small fecal particles were evacuated. The distal 2½ cm. of the appendix were imbedded in a mass of adhesions. The stomach contained 600 c.c. of clotted red blood. In the pyloric region, 2 cm. above the ring, there were two oval, mucosal ulcerations about 1 cm. in diameter, situated on the lesser curvature. These defects appeared to extend only to the submucosal surface. Two other small ulcerations were noted near the larger ones just described. In addition there were found bilateral acute salpingitis due to extension of the inflammatory process to the Fallopian tubes, bilateral hemorrhagic bronchopneumonia, and small pulmonary infarcts of the right lower lobe.

Comment. This case was discussed by Dr. Baehr as an illustration of neglect and mismanagement in the home prior to entry into the hospital. The development of the complications which led to the child's death can be ascribed to delay in seeking medical aid and to the wrongful administration of cathartics.

It was pointed out by Dr. Klemperer that the gastric hemorrhage was first described by Dieulafoy, who called it "gastritis ulcereuse appendiculaire." It has been attributed by some to small retrograde emboli in the portal system. These were not found in this case. There was no relation, in the opinion of Dr. Klemperer, between the gastric ulcerations and the use of the indwelling Levin tube.

Case 2. Trichobezoar. Chronic mechanical ileus (From the Surgical Service of Dr. Richard Lewisohn)

History (Adm.·386301). The patient, a colored housewife, had three admissions to the hospital. On the first admission she was 25 years old. Three years pre-

viously she noted that her stomach was distended and that she was able to feel an epigastric mass. A week and a half before entering the hospital, she had epigastric cramps coming on several hours after meals which caused her to "double up." One week later she was awakened at night by severe abdominal pain; the pain was intermittent, lasted five to ten minutes and radiated to the interscapular region. Relief could be obtained only by standing on her hands and knees. The pain persisted and was accompanied by vomiting of greenish material several times each day. She could not pass gas or feces. Four days later she entered the hospital.

Examination. The patient was thin, undernourished, and appeared acutely ill and distressed. She vomited intermittently, the vomitus being fecal in character. A huge, firm, smooth mass was palpated in the epigastrium. No visible peristalsis



Case 2. Hair-balls, three of which were found at operations and one at autopsy

was present. X-ray examination of the abdomen did not disclose the seat of the obstruction. The blood pressure was 108 systolic and 78 diastolic. A blood count showed 12,500 white blood cells with 91 per cent polymorphonuclear leucocytes.

Course. The impression was that the patient had a high intestinal obstruction due to a lymphosarcoma of the stomach and small intestine. Pre-operative intravenous therapy was instituted, and a laparotomy was promptly performed under spinal anesthesia. At operation the stomach was found to be the seat of a large mass measuring 6 by 4 inches, which occupied the cardiac and antral portions. The mass was hard, smooth and irregular. The small intestines were found to be dilated and thickened up to a point in the upper ileum where another firm mass measuring 4 by 2½ inches was found. In view of the patient's condition, of the

presence of an acute obstruction and because of the possibility of the existence of a new growth, an enteroanastamosis proximal and distal to the mass was performed. A small opening was then made in the anterior wall of the stomach in order to ascertain the nature of the gastric lesion. A hair-ball conforming to the above described dimensions was found and removed (see accompanying photograph).

The postoperative course was uneventful, and the patient left the hospital on the fifteenth postoperative day with the understanding that the foreign body in the small intestine would be removed at a subsequent operation after her general condition had improved.

It was then ascertained that the patient had long had the habit of chewing the ends of her braids. She apparently swallowed a large quantity of hair over a long period.

Second Admission. Three weeks after leaving the hospital, the patient was readmitted. She stated that during the previous week she had had gastric and para-umbilical colic for three days. For one and a half days she had frequent vomiting. Her bowels moved once during this time and only after an enema. Pain and vomiting recurred on the day preceding admission.

Physical examination at this time revealed a healed left upper rectus incision. A peach-sized, movable mass was palpable just above the umbilicus. X-ray examination of the abdomen failed to show evidence of intestinal obstruction. Gastric aspiration returned 80 c.c. of greenish fluid. The blood urea nitrogen was 13 mg. per 100 c.c., and the blood chloride was 525 mg. per 100 c.c. The carbon dioxide combining power of the blood plasma was 49 volumes per cent.

Second Operation. Laparotomy was performed on the fifth day when the patient's general condition was improved. Protruding into the previous enteroanastomotic opening, the foreign body described at the previous operation was palpated. The intestine proximal to this point was only slightly dilated. The foreign body was removed through an incision in the intestinal wall. The postoperative course was satisfactory, and the patient was discharged as improved on the eighteenth postoperative day.

Third Admission. The third and last admission was three weeks after her second discharge from the hospital. She returned this time stating that she had been well until six days previously when she experienced upper abdominal pain and vomiting three to four times a day. She remarked that some hair was contained in the vomitus. There had been no fever or obstipation.

The left upper quadrant and right lower quadrant scars were healed. There was no distention of the abdomen; no tenderness or rigidity were present. No masses were palpable at this time. Stool could be felt on rectal examination, and an enema returned a moderate amount of small particles of formed feces containing hair. Aspiration of the stomach yielded three ounces of fluid material. X-ray examination of the abdomen again failed to show any evidence of intestinal obstruction. The blood urea was 18 mg. per 100 c.c., and the blood chlorides 480 mg. per 100 c.c. The blood CO_2 was 38.5 volumes per cent.

On the evening of the third day the patient's condition suddenly became worse. She vomited thirteen ounces of brown, foul material. Her pulse rate rose to between 140 and 170 per minute and was almost imperceptible. Her extremities were cold and she had the appearance of a patient in shock. X-ray examination of the abdomen showed marked distention of the small bowel, indicative of small bowel

obstruction. An ox gall enema was ineffectual. Because of the patient's condition, operation was thought impossible at that time. On supportive therapy she improved somewhat and seven hours after the original episode, her improvement was such that it was felt that the life-saving measure of removal of the foreign body should be resorted to in spite of the grave risk. Accordingly, ileostomy was performed under local anesthesia and another hair-ball was removed. The patient failed to rally and died nine hours after operation.

Post Mortem Findings. The only significant post mortem findings were hemorrhagic necrotizing ileitis, jejunitis, and duodenitis with marked distention. A fourth walnut-sized hair-ball was found about 30 cm. proximal to the ileostomy wound. Necropsy also revealed an old thickening of the mitral valve, probably of rheumatic etiology. Death was considered to be due to chronic mechanical ileus.

Reported by Frederick H. King, M.D.

ABSTRACTS

Authors' Abstracts of Papers Published Elsewhere by Members of The Mount Sinai Hospital Staff

Members of the hospital staff and the out-patient department of The Mount Sinai Hospital are invited to submit for publication in this column brief abstracts of their articles appearing in other journals.

Über die Herzwirkung von Hypophysenhinterlappenextrakten am Hund unter natürlichen Kreislaufbedingungen. W. Antopol and R. Rössler. Ztschr. f. d. ges. exper. Med. 94: 453, 1934.

Studies were made in the intact dog in which the arterial, left auricular, and right auricular blood pressures were registered.

The intravenous injection of pitressin was followed by a fall in arterial pressure and a rise of pressure in both auricles (a manifestation of spasm of the coronary arteries with resulting cardiac failure). After atropinization, intravenous injection of pitressin produced a much greater rise of pressure in the left auricle than in the right.

The injection of pitressin after previous intravenous administration of adrenalin caused sudden death in two cases. The previous intravenous treatment of the animal with papaverine invariably prevents the pitressin effect on the heart.

Circulatory Dynamics in Myocardial Infarction. A. M. Fishberg, W. M. Hitzig, and F. H. King. Arch. Int. Med. 54: 997, December 1934.

Fifty-nine patients with recent myocardial infarction were studied from the point of view of circulatory dynamics. The venous pressure was measured in all, the circulation time in thirty-eight, and the volume of circulating blood in twenty-nine of the subjects.

Two distinct mechanisms participate in the derangement of the circulation in myocardial infarction: (a) shock or peripheral circulatory failure, which diminishes the venous return to the heart and tends to lower the pressure in the large systemic veins, and (b) heart failure, which tends to engorge the pulmonary circuit in consequence of insufficiency of the left side of the heart and to raise the systemic venous pressure in proportion to the insufficiency of the right side of the heart.

In initial myocardial infarction in persons without previous severe heart failure, the clinical picture is most often predominantly that of shock. The venous pressure is then subnormal. The blood flow through the lungs is slowed slightly, if at all. The volume of circulating blood tends to be diminished.

When infarction affects patients with previous heart failure, the manifestations either of shock or of cardiac insufficiency may predominate. When heart failure

predominates, the venous pressure is elevated or normal, the flow of blood through the lungs is retarded, and the volume of circulating blood is increased.

The diminished venous return due to shock lessens the work of the heart and thus militates against the development of cardiac insufficiency. It is because of this diminution in the venous return to the heart that engorgement of the lungs and systemic veins may be absent despite extensive myocardial infarction.

The fall in arterial pressure is due not only to the weakness of the left ventricle but also to the peripheral circulatory failure or shock. Apparently the latter is usually the more important of the two factors. It is because of the concomitant presence of shock that a fall in the arterial pressure is so much more prominent in myocardial infarction than in other lesions of the heart.

Statistically, the immediate prognosis of myocardial infarction is better with low than with high venous pressure. The type of circulatory failure present is of significance for the rational treatment of patients with myocardial infarction.

Circulation Time in Failure of the Left Side of the Heart. W. M. Hitzig, F. H. King, and A. M. Fishberg. Arch. Int. Med. 55: 112, January 1935.

In isolated failure of the left side of the heart the arm-to-tongue circulation time is almost always prolonged, sometimes to three times the normal value. On the other hand, the arm-to-lung circulation time in failure of the left side of the heart may be normal despite markedly prolonged arm-to-tongue circulation time. This indicates that the prolongation of the arm-to-tongue circulation time in these cases is due to slowing of the pulmonary blood flow downstream from the arterial capillaries of the lung.

The prolongation of the arm-to-tongue circulation time does not always parallel the severity of the other symptoms of failure of the left side of the heart. In exceptional cases the arm-to-tongue circulation time is within normal limits despite severe symptoms of failure of the left side of the heart.

The circulation time in failure of the left side of the heart with normal rhythm may be shortened by digitalization, furnishing further objective evidence of the utility of digitalis in many patients with this circulatory disturbance. The systemic venous pressure is normal in isolated failure of the left side of the heart.

Cardiovascular Studies in Patients with Single Functioning Lungs. A. M. Master, H. L. Jaffe, and S. Dack. Proc. Soc. Exper. Biol. & Med. 32: 1215, April 1935.

This is a study of five patients with only one functioning lung following thoracoplasties for unilateral empyema, tuberculosis or abscess. All were dyspneic on exertion but not at rest. Neither cyanosis nor orthopnea were present. The heart was normal or slightly rotated (in two cases there was a tendency to right ventricular preponderance; in one, left ventricular preponderance was present). The pulse was rapid. The blood pressure was normal. Respiration was normal at rest but became more rapid after slight exertion. The vital capacity was distinctly diminished, the highest being 2700. The circulation time from arm to lung or tongue was rapid. The venous pressure was at the upper limit of normal or above. In two patients the basal metabolism and oxygen content and capacity of the arterial blood were tested and found normal. Exercise tolerance was much diminished.

It was concluded that these patients were comfortable at rest, despite the low vital capacity, because of the increased blood flow to the functioning lung as a result

of the increased blood velocity and heart rate; even moderate exertion sufficed to upset this balance.

Influence of Bile Salts on the Nervous System Following Intraspinal Usage. S. S. Lichtman and E. L. Stern. Proc. Soc. Exper. Biol. & Med. 32: 1201, April, 1935.

The direct action of bile salts on nerve tissue was investigated in cats in the belief that analgesic properties might permit intraspinal usage in the relief of intractable pain. The same technique as used for the intraspinal injection of alcohol in such cases was adhered to, using sodium desoxycholate. Motor and sensory studies were made in living animals, and the cords were studied histologically.

It was found that desoxycholate could be introduced intraspinally in minute doses in aqueous solution without untoward effects or injury to the cord. Larger doses produced motor and sensory disturbances and even death from respiratory paralysis. Traumatized spinal cord tissue was highly susceptible to the toxic action of even minute doses of bile salt in alcoholic solution although apparently resistant to the same doses in aqueous solution.

Analgesic properties were not demonstrable without motor paralysis.

The Two-Step Test of Myocardial Function. A. M. Master. Am. Heart J. 10: 495, April 1935.

A simple quantitative "two-step" test of myocardial function is described and tables of ascents are given for normal individuals of different weights and ages. The ascents are performed at a walking rate for only a minute and a half. Normally the patient's blood pressure and pulse rate should return to previous levels within two minutes. The test is both quantitative and qualitative.

The results obtained after hundreds of tests on normal individuals are reported. The maximum exercise tolerance for men is about 3800 ft. lbs. of work, usually attained between the ages of 22 and 31 in persons weighing 170 to 200 lbs. For women it appears to be 3000 ft. lbs. of work at the ages of 20 to 27 in individuals weighing 150 to 180 lbs. The exercise tolerance test may be the only objective method of determining that the myocardium is involved.

Capillary Development and its Relation to the Intelligence of Children with Mongolism. S. D. Leader and M. Grozin. Am. J. Dis. Child. 49: 1169, May 1935.

IN MEMORIAM

Irwin I. Davis, M.D.

Milton Steiner, M.D.

(*Members of the House Staff*)

VOLUME III JANUARY-FEBRUARY, 1937 NUMBER 5

JOURNAL
OF
THE MOUNT SINAI HOSPITAL
NEW YORK

UNILATERAL LORDOTIC ALBUMINURIA (ORTHOSTATIC ALBUMINURIA)

EDWIN BEER, M.D.

Though it is well recognized that albuminuria, due to posture, occurs in children and in the second and third decades of life without leading to any significant changes in the kidneys, the surprising variety of names given to this type of albuminuria suggests that there is still doubt as to the causative factor. According to French (1), this type of albuminuria masquerades in the medical literature under many names, such as accidental, essential, postural, cyclic, orthostatic, intermittent, physiological, functional, orthotic, Pavy's disease, albuminuria of adolescence and albuminuria of puberty.

It will be noted that in this group of names, the term, lordotic albuminuria, is absent, despite the fact that Jehle in 1909 (2) made his important contribution and called attention to the fact that exaggerated lordosis (D12, L1, and L2) almost regularly produced a massive albuminuria in the affected individuals. From my own observations I am inclined to believe that practically all cases of this group, usually called orthostatic albuminuria, are of the type described by Jehle, and this can be demonstrated by producing massive albuminuria after maintaining the position of extreme lordosis for ten minutes or more. In view of the fact that in extreme lordosis the left renal vein is probably regularly compressed against the aorta, the lordotic albuminuria is liable to be unilateral, and by cystoscopic examination, combined with careful ureteral catheterization, it has been possible to demonstrate the unilaterality of the albuminuria.

Most of these cases are characterized by the absence of albumin in the urine after a night's rest, provided the individual does not assume a lordotic position in bed. After the patient is up and about, provided his erect position is associated with lordosis of the last dorsal and upper lumbar vertebrae, a mild or strong albumin reaction is liable to develop. Moreover, if such individuals are placed in a kneeling position, with shoulders thrown well back, in other words in well marked lordosis, the urine, which prior to assuming this position may have been almost free of albumin, will regularly develop a marked increase of albumin, together with the appearance of formed elements in the urine. This extreme lordosis must

be maintained from ten to twenty minutes to get the proper result. Frequently, after this position is assumed, the urine will boil solid with the acetic acid test, and with the nitric acid ring test a very heavy ring of albumin will be demonstrable. Among the formed elements which have been found are hyaline and granular casts with leucocytes and some erythrocytes.

Jehle suggested that the lordosis compressed the inferior vena cava and interfered with the venous renal back flow, thus inducing the albuminuria. If this were the normal mechanism, the albumin should be derived from both kidneys, whereas studies made by Sonne (3) suggest, as many suspected, that the albumin probably was derived from the left kidney due to interference of the blood flow by compression of the left renal vein over the aorta, induced by the lordosis. As is well known, the left renal vein is longer than the right and passes usually in front of the aorta, against which it may readily be compressed. Kelling (4) and more recently McCrae (5) suggested the possibility that the left renal vein was compressed in lordosis between the superior mesenteric artery and the aorta. This mechanism may obtain in such cases, but to prove it to be the underlying cause of the disturbance of the back flow from the left kidney is at present impossible.

Having been interested in this condition since 1908, I have examined a number of cases of so-called orthostatic albuminuria by placing the patient in lordosis, and have regularly found that in the lordotic position massive albuminuria can be produced. Attempts made without cystoscopy, using excretory urography in recent years, to demonstrate a disturbance in the left kidney have been unsuccessful, whereas in two cases which I have had the opportunity to cystoscope and catheterize, I have been successful in demonstrating that no albumin came from the right kidney and that there was a well marked or massive albuminuria from the left kidney without any admixture of red blood cells (and albumin) due to traumatism of the ureters.

In the cystoscopy and ureter catheterization which Sonne carried out in this type of case, he was apparently less successful in excluding mild traumatic hematuria, which obviously led to less accurate results. In his series he found two cases in which there was albumin from the left kidney and no albumin, except such as could be accounted for by traumatic hematuria, from the right kidney.

The importance of differentiating these cases of albuminuria from organic disease of the kidney is self evident, as many of these patients in the second and third decades may be denied life insurance. Some few cases, especially in younger children, are liable to be confused with chronic pyelonephritis. Thus, it would seem highly desirable to test each case and note whether induced lordosis would materially increase the amount of albumin. After this has been done and proven positive, it is further advisable to place the patient in lordosis for fifteen to twenty minutes and then cystoscope him

and catheterize the ureters in order to determine whether the process is left-sided. Also in view of the fact that one may be dealing with nephritis, cystoscopy is all the more essential. The finding of a pure left-sided albuminuria, in the absence of acute or chronic inflammatory disease of the left kidney, particularly renal tuberculosis, is conclusive evidence that the process is a purely local condition due to vascular obstruction.

The study of the following two cases demonstrates clearly the nature of this disease, as proven by ureter catheterization, which excludes renal pathology.

CASE REPORTS

Case 1 (Adm. 387817). In November 1935, the patient, a 27 year old man, began to experience dizzy spells and pain in both sides of his back. He reported that his urine had been examined by a physician and had shown a trace of albumin with oxalate crystals, some pus, a few erythrocytes, and a few hyaline casts. No X-ray studies had been made, and no cystoscopy was done. There were no local symptoms. His appetite was poor, and he had lost ten pounds during the previous year. His blood pressure had been low, varying between 90 and 100 systolic. On November 16th, a general physical examination showed the abdomen to be negative; there was no tenderness, and the external genitalia were normal. The prostate was bilobed, smooth, and not enlarged. The blood pressure at this time was 120 systolic and 80 diastolic. After being up all morning, shortly after mid-day his urine showed acid reaction with one plus albumin and an occasional white blood cell, some red blood cells, and an occasional hyaline cast on microscopic examination. The patient was then placed in extreme lordosis, in kneeling position with his shoulders thrown back, for ten minutes. The urine then showed a marked increase of albumin (four plus).

He was referred to The Mount Sinai Hospital for excretory urograms and cystoscopy to determine from which kidney the albumin was derived. On December 19, 1935, early in the morning, the lordotic test was again made in the hospital. At first the urine had shown no albumin, but after ten minutes of lordosis, the urine showed *three plus* albumin. Two excretory urograms were made, which failed to show any disturbance in the topography of the kidney pelves, calices or ureters. There was good function in both kidneys, despite the fact that the patient had been placed in lordosis for ten to fifteen minutes prior to these excretory urograms. Subsequently after fifteen minutes of extreme lordosis, the patient was cystoscoped. His bladder urine was clear and again contained three plus albumin with the acetic acid test. No casts were found. There were a few white blood cells per high power field. The picture of the bladder and ureter orifices was normal. Both ureters were catheterized 10 to 15 cm., so as to avoid any bleeding which might interfere with the interpretation

of the tests. The specimen from the left kidney with the nitric acid ring test showed a very heavy ring of albumin, and microscopically the specimen contained eight to ten white blood cells per high power field, a few red blood cells and a few granular casts. On the right side the specimen showed no trace of albumin, and there were two to three white blood cells per high power field. The accompanying photograph of the two specimens with the nitric acid ring test demonstrates perfectly the heavy albumin excretion from the left kidney, and the negative test on the specimen from the right kidney.



Nitric acid ring test, showing heavy albumin excretion from the left kidney and the negative test on the specimen from the right kidney.

Comment. Analysis of these data confirms the fact that in this patient, suffering from so-called orthostatic albuminuria, really lordotic albuminuria, the left kidney alone contributed to the albuminuria, which was definitely unilateral, as proven by cystoscopy.

Case 2 (Adm. 376427). The patient, a nine year old boy, was operated on a year before admission for a gangrenous appendix, at which time the urine showed one to two plus albumin, no casts, few red blood cells and a few white blood cells. The patient had been X-rayed before admission to The Mount Sinai Hospital, and the excretory urogram, as well as the flat

plates, showed no calculi or visible disturbance. The patient was thought to have endocarditis, which was ruled out by subsequent, more expert examination. The patient was first seen on February 5, 1935. Examination showed normal genitalia. The left kidney was just palpable in the lateral position. Examination of the urine in the office, after the patient had been up and about all morning, showed a trace of albumin, and after extreme lordosis for ten minutes, a very heavy trace of albumin appeared in the urine, much more than prior to the lordosis. On February 7, 1935, the patient was examined at The Mount Sinai Hospital. The morning specimen of urine showed no albumin; the evening specimen, after the patient had been up, showed a fair amount of albumin. Under avertin and gas-oxygen anesthesia, the patient was cystoscoped, being placed on the cystoscopic table in extreme lordosis. Cystoscopy showed normal bladder and ureter orifices. Both ureters were catheterized a short distance. The bladder specimen after this lordosis showed a good trace of albumin. The right kidney specimen was perfectly clear and gave no nitric acid ring test. Subsequent specimens became blood-tinged and naturally gave a positive ring test. On the left side, the kidney specimen was also clear, not blood-tinged, and gave a good nitric acid ring test. The examination was rather difficult because of the slow excretion of urine under the anesthesia, but it was evident that the albumin was derived from the left kidney. Retrograde uretero-pyelogram was subsequently done on the left side and showed no definite anomaly.

Comment. In this case, as in Case 1, on lordosis the albumin was definitely increased, and on separating the specimens from the two kidneys, here again the right kidney showed no albumin before traumatic bleeding appeared in the specimen, and the left kidney showed definite albuminuria.

REFERENCES

(1) French, H.: Index of Differential Diagnosis. William Wood & Co., Baltimore, 1928.
(2) Jehle, L.: Die lordotische Albuminurie. F. Deuticke, Leipzig u. Wien, 1909.
(3) Sonne, C.: Ztschr. f. klin. Med. 90: 1, 1920.
(4) Kelling, G.: Zentralbl. f. inn. Med. 40: 313, 1919.
(5) McCrae, T.: Modern Medicine, edited by W. Osler and T. McCrae. Lea & Febiger, Philadelphia, 1909, vol. 6, p. 17.

SUPERIOR SULCUS TUMOR

ELI MOSCHCOWITZ, M.D.

[*Medical Service of Dr. B. S. Oppenheimer*]

This disease, described only a few years ago as a new disease entity, is probably nothing more than a syndrome. Nevertheless, its recognition is important because it enables the clinician to recognize and localize a primary tumor of the lung by subjective symptoms only.

History (Adm. 373023). The patient was a man, aged 53, who was admitted to the hospital on November 5, 1934. Three months earlier he developed pain in the right shoulder which began in the right interscapular region and radiated anteriorly to the axilla and upper right chest. He also noticed marked sweating of the right side of the face.

Examination. The right side of the face was covered with a profuse perspiration. There was a suggestion of a right-sided enophthalmos. The fundi showed some arteriosclerotic changes. There were a number of hard, shotty nodes on both sides of the neck. The neck veins were distended. There was considerable tenderness over the right interscapular region between the first and fourth dorsal vertebrae. Dulness was found over the upper right lobe anteriorly to the second rib and posteriorly to the fourth dorsal vertebra. Over this area the breath sounds were diminished. Occasional moist râles were heard below the angle of the scapula on the right side and at the base of the right axilla. The tip of the spleen was just palpable. There was a suggestion of clubbing of the fingers and toes. An area of hyperalgesia was found in the right interscapular region between the angle of the scapula and the spine and a similar area just below the nipple. The hemoglobin was 80 per cent; the white blood count was 16,400 with a normal differential count. The blood Wassermann test was negative. A laryngeal examination was negative. The pilocarpine test showed a marked hyperhydrosis of the right side of the face. A lumbar puncture showed the cerebrospinal fluid to be under increased pressure, but there were no cells in the fluid. The venous pressure in the right cubital vein was 5 cm., in the left 3.5 cm.

X-ray examination of the chest showed a dense shadow at the medial border of the apex of the right lung extending somewhat below the clavicle (see accompanying illustration). The posterior portion of the transverse process of the third cervical vertebra was eroded. There was complete destruction of the third rib posteriorly near its articulation with the vertebra and complete destruction of the right transverse process of the third dorsal vertebra.

Course. The patient was discharged on November 22, 1934. He was steadily losing ground. The entire right upper chest now showed signs of an underlying consolidation and a bulge appeared in the region of the second, third, and fourth ribs between the spine and the medial border of the scapula. He died February 2, 1935.



Roentgenogram of the chest, showing a dense shadow at the medial border of the apex of the right lung

COMMENT

In 1932, Pancoast (1) reported eight cases which he believed represented a new disease and for which he suggested the name superior sulcus tumor. The main features of this disease, according to Pancoast, are the following: (a) pain around the shoulder and upper arm; (b) occasional loss of power and atrophy of the muscles of the hand; (c) an invariable Horner's syndrome; (d) a circumscribed small roentgenographic shadow at the apex of the lung with destruction of the posterior portions of the first, second and third ribs and often the adjacent vertebrae. None of Pancoast's cases came to autopsy; in two a biopsy was performed; in one a diagnosis of "carcinoma spinocellular" was made; in the second, carcinoma. As far as I can find, the only case that came to autopsy was reported by Clarke (2) who reports the histological diagnosis of epidermoid carcinoma.

Pancoast suggested that the tumor is of bronchiogenic origin from the fifth pharyngeal pouch.

There is excellent reason for believing that the disease described by Pancoast is not a new disease entity with a restricted pathological background, but a syndrome provoked by a lesion of varying character and origin invading the region of the superior sulcus. Our reasons for this belief are the following. It has been definitely established in the laboratory of The Mount Sinai Hospital that these squamous celled tumors are in most instances carcinomata arising from the terminal bronchi of the lung. Such tumors always occur at the periphery of the lung and are by no means strictly localized to the superior pulmonary sulcus. Owing to their peripheral character, invasion of the bony chest wall is exceedingly common, giving rise to radiating pain. Furthermore, these tumors are always sharply circumscribed from the lung parenchyma. Pancoast's cases, therefore, represent merely carcinoma of the terminal bronchi lying in the superior aspect of the lung.

REFERENCES

(1) Pancoast, H. K.: Superior Sulcus Tumor. J. A. M. A., 99: 139, 1932.
(2) Clarke, E. B.: Superior Sulcus Tumor. Am. J. Path., 10: 693, 1934.

A CASE OF LEPTOTHRICOSIS

ELMER S. GAIS, M.D.

[*Medical Service of Dr. George Baehr*]

Human infection with the leptothrix has rarely been reported in the medical literature. The recent summary by Harris (1) brings the subject to the present date, and, with the monographs of MacKenzie (2) and Huntemüller (3) it contains the best available information.

The organism is of the order Actinomycetales, family Actinomycetaceae, genus Leptotricia, characterized by long, thin, mycelial threads with no capsule or only a very delicate one, is non-branching, non-septate and generally non-cultivatable (4). About twelve species have been identified, differing in some of their characteristics and staining qualities. This organism, which usually inhabits the upper respiratory and vaginal tracts as a simple saprophyte, was found to invade the pleura (5), producing empyema (6), the liver (1), the tongue (7), the pharynx (8, 9), and even the spinal meninges (6). It is of interest, in respect to the case to be reported, that the fairly common Parinaud's conjunctivitis is ascribed to invasion of the lachrymal system by this organism (10). There have been reported two instances of acute glomerular nephritis, one following a leptothrix angina (9) and the other a leptothrix mycosis of the tongue (8). Dick, Dick and Rappaport (11) reported an interesting case of chronic hemorrhagic nephritis, believed to be caused by the leptothrix. Leptothrix invasion of the lung parenchyma has been described recently by Thjøtta (12), Nicod (13) and Sternberg (14).

CASE REPORT

History (Adm. 368223). The patient, a sixty-year old man, was first admitted to the Eye Service of the hospital on April 24, 1934, complaining of dimness of vision, pain and redness of the right eye of a few weeks duration. Ten weeks previously he had experienced an attack of precordial pain radiating down his left arm, which was diagnosed as a coronary artery thrombosis and confirmed by an electrocardiogram taken by his private physician. Three weeks later he had an epistaxis, following which there was diminution in vision and photophobia of the left eye. The epistaxis recurred several times in the next few weeks.

Examination. There was a shallow ulcer of the ocular conjunctiva which almost completely encircled the nasal border of the cornea and which was undermined in places. An associated keratitis and iritis near this ulceration were present. There was a similar appearing ulcer on the left side

of the nasal septum, and a polypoid mass obstructing both left and right middle meati. There was bilateral antral sinusitis. The vision was O.S. normal and O.D. 15/200. The hemoglobin was 83 per cent. The leucocytes numbered 15,500, with a differential count of 74 per cent polymorphonuclear neutrophiles (33 per cent non-segmented and 41 per cent segmented), 5 per cent eosinophiles, 18 per cent lymphocytes and 3 per cent monocytes. The blood urea was 15 mg. and sugar 115 mg. per 100 c.c. blood. The urine showed no abnormalities. The blood pressure was 165 systolic and 95 diastolic.

Course. A biopsy of the conjunctiva showed an acute and chronic inflammatory process in the fragment of the conjunctiva. Some of the material was injected into the anterior chamber of the eye of a rabbit; the animal died, however, four days later before definite changes were noted. The eye condition was diagnosed as an acute granuloma of the conjunctiva, secondary to the nasal infection. The temperature did not rise over 99.6°F.

On May 1, 1934, a similar condition was noted on the temporal side of the cornea. X-ray of the sinuses showed a marked clouding of both antra, right ethmoid and right frontal sinuses, with some osteitis about the right frontal sinus. On April 27th an X-ray picture of the lungs was taken, but it did not reveal any abnormality. He was discharged improved and a follow-up examination showed a heaping up of the pericorneal tissue, flattened, pale and almost completely epithelialized. There was a slight haze in the extreme periphery of the cornea.

Second Admission. On July 2, 1934, he was admitted to the Medical Service of the hospital. He complained of buzzing and diminished hearing in the right ear with a purulent discharge of four weeks duration. For two weeks he had had a similar discharge and some pain in the left ear, and had experienced an attack of vertigo. During this four week interval, he had frequent nosebleeds. For ten days his ankles were swollen and painful. He had nocturia two or three times. There was an occasional productive cough, with blood streaked sputum.

Examination. On admission his temperature was 102°F., pulse rate 100 and respirations 23 per minute. The blood pressure was 134 systolic and 70 diastolic; he was pallid, the lower lids were puffy and there was some edema of the ankles. The lesion on the conjunctiva was healed with a flat, pigmented scar; the fundi presented narrowed arteries and dilated veins but no hemorrhages or exudates. Both middle ears were discharging purulent material from antero-inferior perforations, the right more than the left. There was no mastoid tenderness. The hearing was markedly impaired in the right ear. There was a suppurative sinusitis, most marked in the right antrum. The hemoglobin was 62 per cent. The white blood cells numbered 9,800 with 76 per cent polymorphonuclear cells, 36 per cent of which were segmented and 40 per cent non-segmented; lymphocytes 22

per cent and monocytes 2 per cent. The neutrophiles showed marked toxic granulations. The sputum and the aural discharge showed gram positive cocci but no tubercle bacilli. Sedimentation time was twenty minutes. X-ray films of the mastoids revealed a normal left mastoid but profuse bone absorption of most of the intercellular septa, particularly in the knee of the sinus, without evidence of bone reaction.

Some scattered râles and dulness were noted over the right upper lobe, and a radiographic examination of the chest on July 5th showed several faint circular shadows in the right upper lobe at the level of the first to the third ribs anteriorly. There was one similar small shadow in the left lower lobe. An electrocardiogram showed a large Q_3 with moderately low voltage QRS. The RS-T transition was depressed and the T was of low voltage in all three leads.

Course. On July 7 his hemoglobin had dropped to 52 per cent. The temperature was septic. On July 9th the white blood cell count was 12,000 with an unchanged differential count. The following day there was slight injection of the middle half of the right bulbar conjunctiva which did not progress.

On July 11th pharyngeal lesions were first noted. They extended gradually until they formed symmetrical, irregularly circular patches, yellowish-white with indefinite borders like a beaded network. They were quite painful. A crater-like ulcer appeared on the buccal mucosa and a small aphthous-like lesion occurred on the undersurface of the right side of the tongue. The hemoglobin fell to 45 per cent and the patient was transfused. Numerous smears from the throat lesions showed gram positive organisms and occasonally a long filiform bacillus. No Vincent's organisms were found. On one occasion a cluster of mycelial forms was seen in the wet sodium hydroxide preparation from the pharyngeal exudate. A biopsy of the throat lesion showed a fragment of mucosa with superficial necrosis and diffuse purulent inflammatory reaction. There was no evidence of tuberculosis but a large number of gram-positive cocci were found.

On July 15th extension of the pulmonary process was noted. Cultures of the ear exudate showed B. pyocyaneus and Staphylococcus albus. Cultures of material from the palate showed Staphylococcus aureus, Streptococcus viridans, but no diphtheroids. The blood culture was sterile. The blood urea, which had been 12 mg. per cent on July 7th, gradually rose to 93 mg. per cent by July 17th. This was associated with anuria and increasing edema. The urine, which had shown only a few red cells and a small amount of albumin, now became definitely hematuric.

On July 18th anal lesions resembling the pharyngeal lesions were first noted. He was given several citrate blood transfusions and the usual supportive measures, but death occurred in "uremic" coma and sepsis on July 20th.

NECROPSY FINDINGS

Gross Anatomy. The autopsy was performed three hours postmortem. The *tongue*, *hard* and *soft palates* and *uvula* displayed numerous irregular ulcers with shaggy grayish-red bases. The surface of the *epiglottis* presented numerous brownish-gray ulcerations with two similar lesions below the vocal cords. There were granulations throughout the entire length of the *trachea* with mucosal ulcerations between the cartilaginous rings. The tracheal wall was thickened, indurated and firm. A small amount of clear fluid was found in the pleural cavity.

The *lungs* weighed 1400 gm. Large, dull, brownish, slightly granular plaques were seen in the visceral pleura. The right lung showed two large nodules, 6 by 3 cm. and 1 by 2 cm., in the upper lobe, plus irregularly scattered similar but smaller, firm, slightly elevated, grayish nodules, about 0.5 cm. in diameter. There were some larger hemorrhagic areas which were firm and coarsely granular. The left lung showed numerous similar small nodules scattered diffusely throughout the parenchyma. The *bronchial mucosa* leading to these areas was covered with granules like those in the trachea.

The *heart* weighed 360 gm. On the endocardium at the apex and posterior wall of the left ventricle, was a smooth, grayish-pink, firmly adherent, lamellated thrombus. The myocardium under this area was very thin, silver-gray, with no visible muscle. The anterior descending branch of the left coronary artery was narrowed in its proximal half but occluded in its distal portion. The occluded portion showed a brownish tinge on section (recanalized).

The *spleen* weighed 90 gm. On section the greater part consisted of irregular, elevated, pale yellow areas which exuded a gelatinous fluid on pressure. Each of these areas was demarcated by a firm, translucent gray zone which was continuous with the fibrous trabeculae of the spleen. The remainder of the organ was red, homogeneous and fleshy. The Malpighian corpuscles were seen as grayish dots.

The left *kidney* weighed 240 gm. and the right 250 gm. The capsule stripped easily from each, leaving smooth surfaces mottled with small, punctate red areas and minute, irregular, yellow patches. The cut surface showed similar mottling throughout the cortex. The right kidney showed the same findings and also presented a large, healed infarct.

The *ileum* showed numerous ulcerations involving the lymphoid patches. The mucosa of the *anal canal* was ulcerated, with a black, shaggy, necrotic base extending around the entire anus, delimited from the rectum by a firm raised border.

The *bone marrow* of a lumbar vertebra was red and moist.

Microscopic Anatomy. Tongue: An area of necrotic tissue denuded of epithelium, infiltrated with leucocytes, extended down to and involved the muscularis. The azure B stain of the necrotic tissue revealed streptococci

and short, thick, blue-staining rods with lighter central portions, in addition to many smaller bacteria.

Hypopharynx: The superficial layers lost their architecture and contained an infiltration of macrophages and lymphocytes extending down to the muscularis. The submucosal blood vessels were congested and one vessel contained a red-purple staining mass with entrapped round cells and lymphocytes in a fibrillar structure. There were no points of attachment to the vessel walls, and the masses contained no fibroblasts.

Trachea: The architecture of the mucosa was entirely destroyed. The tissue stained a granular purple; the cellular infiltrate of polymorphonuclear cells in some areas extended into the submucosa and around the mucous glands. In some regions the lymphocytes predominated. In the destroyed mucosal areas several of the blood vessels were occluded by red purple masses containing erythrocytes and occasional lymphocytes. These masses appeared to be attached to the vessel wall but there was no evidence of fibroblastic invasion of the masses. The azure B stain revealed the same organisms as found in the tongue.

Bronchus: The mucosa was almost entirely absent and replaced with the granular, blue-staining tissue. No organisms were demonstrable.

Lungs: Right Upper Lobe Nodule: The destroyed pulmonary structure was replaced by foci of granular necrotic areas, occasionally fusing, containing broken-down nuclei, extravasated erythrocytes and ghosts of parenchymal cells. The Weigert-Van Gieson stain revealed remnants of vascular and alveolar elastic fibres. Surrounding this region was highly vascular, fibrous tissue containing a few alveoli lined by high cuboidal epithelium, many polymorphonuclear cells, black pigmented macrophages, lymphocytes and giant cells. Here, there were a few arteries showing intimal proliferations and occasionally containing pink staining masses with enmeshed leucocytic thrombi. Similar thrombotic masses were found within small pulmonary veins. In areas the bronchioles were destroyed and their lumina contained large clumps of polymorphonuclear leucocytes. In some areas the alveolar spaces were filled with extravasated erythrocytes and extensive cellular infiltration. The azure B and Ziehl-Neelsen stains failed to show the presence of organisms.

Second Nodule in the Right Upper Lobe: Some of the smaller branches of the pulmonary vein were occluded by a thrombus containing many fibrils enmeshing many polymorphonuclear cells and a few lymphocytes, attached to the vessel wall by fibroblastic invasion. There was a large area where the alveolar structure was only occasionally distinguishable and which showed extensive exudation of leucocytes and extra-vascular erythrocytes, plus many macrophages containing brown pigment. The surrounding alveoli were atelectatic, some of them containing patches of hemorrhagic exudate. Contained within the purple granular débris in a markedly dilated bronchus was a clump of blue staining large rods with

lighter centers and flat ends, round cells, polymorphonuclear leucocytes, erythrocytes and histiocytes. The submucosal layer was replaced by highly vascular, infiltrated fibrous tissue. Section stained with azure B showed large rod-like organisms, as previously described.

Left Lower Lobe: There were smaller foci of hemorrhagic exudate. Some of the alveolar lumina contained homogeneous pink-staining fluid, others contained extravasated erythrocytes, and others, varying numbers of leucocytes. Some of the bronchioles were filled with fibrin and polymorphonuclear cells. The Ziehl-Neelsen stain was negative for tubercle bacillus and the azure B stain showed the presence of a few of the rod-like organisms described in the foregoing.

Heart: Left Apex: The endocardium was markedly thickened by fibroblastic proliferations and showed patches of necrosis with leucocytic infiltration. The muscle fibres were interrupted, necrotic, infiltrated, with some areas of fibroblastic proliferation. The Van Gieson stain demonstrated reduplication and fragmentation of the elastic fibres of the endocardium and reduplication of the fibres of the internal elastic membrane of the smaller branches of the coronary arteries.

Liver: One central vein showed a red, granular mass containing fibrils, enmeshed erythrocytes and round cells. There was some fibroblastic invasion from the vessel wall. Several portal veins contained similar masses.

Spleen: The capsule was irregular, thickened, and consisted of vascularized fibrous tissue infiltrated with round cells and macrophages. The splenic architecture was almost completely destroyed, replaced by large areas of necrosis, some of which contained polymorphonuclear cells, pyknotic and karyorrhectic nuclei, remnants of reticulum, trabeculae and Malpighian corpuscles. The intervening tissue contained erythrocytes and occasional focal accumulation of lymphocytes. In it the reticulum cells were increased, very prominent, and contained occasional lymphocytes in their meshes. The azure B stain did not demonstrate any organisms. Some of the splenic arteries and veins contained pink-staining fenestrated granular masses with entrapped round cells and polymorphonuclear leucocytes. One of these masses was invaded by fibroblasts arising in the wall of the vessel.

Adrenal: The capsule was thickened. The zone of glomerulosa was partially replaced by fibrous tissue. Some of the small veins contained homogeneous thrombi.

Ileum: There was an area of denuded mucosa with necrosis extending into the muscularis. Near one edge were two thrombosed blood vessels. The lymphatics contained leucocytes. The azure B stain showed the rod-like organisms.

Anorectal Junction: There was an extensive area of necrosis containing

cellular débris underlying hemorrhage and leucocytic infiltration. Many blood vessels were thrombosed. The muscularis was infiltrated and hemorrhagic. The azure B stain revealed the same rods as have already been described.

Kidneys: The capsules were normal. The glomeruli were almost universally affected, the tufts enlarged and ischemic, and the individual loops difficult to recognize. In many instances a portion of the tuft was filled with hyaline-like material. In some glomeruli the capillary wall had been completely involved; in others a portion of the tuft presented no histologic changes. The capsular epithelium had proliferated frequently. Rarely, this progressed to distinct crescent formation. The loops adhered to the capsular epithelium. Infrequently there was replacement by fibrosis of a tuft. The interstititium was edematous; occasionally the connective tissue was increased. In irregularly scattered areas, particularly in the zones surrounding the more marked glomerular changes, there was isolated cellular infiltration. The blood vessels of the interlobular variety, and occasionally a narteriole, were thickened and showed necrotic mural foci. The tubular epithelium was swollen, vacuolated and occasionally desquamated. The nuclei were mostly well preserved. In the lumina were numerous agglutinated erythrocytes. Several interlobar arteries were thickened and widened slightly.

BACTERIOLOGY

The culture of material from the areas in the lungs yielded staphylococcus and streptococcus, and a gram-positive, non-acid fast, non-branching filament which grew best anaerobically on enriched blood agar plates, in yellowish, wrinkled, flat colonies. It grew slightly aerobically and on Sabouraud's media. Inoculation in the groin, peritoneum, and nasal cavity of guinea-pigs produced only a slight regional lymph-node swelling from which no organisms could be obtained. These characteristics would seem to classify the organism in the genus leptothrix.

COMMENT

There is little doubt that the lesions in the upper respiratory tract, the lungs, the ileum and the anus, were caused by the leptothrix, which was cultured from the lung and stained in situ in these locations. A more exact classification of the organism was not possible. The initial lesion on the conjunctiva could not be classified. It did not resemble Parinaud's conjunctivitis. The patient had a diffuse infection of the upper respiratory tract including the middle ear and accessory nasal sinuses. Engrafted on this ensued a more or less superficial invasion by the leptothrix, which extended down the bronchi and into the lung parenchyma where it formed the necrotic nodules. The renal lesions are best described as "acute

glomerulonephritis of the diffusely focal type". The tendency to thromboses was notable in the areas of ulceration. The spleen presented the picture of a speckled or Feitis spleen.

There is no evidence in the literature excepting, perhaps, a case of Dick, Dick and Rappaport (11) which ascribes nephritis to infection by the leptothrix. In their case of chronic hematuria the leptothrix was cultured from the urine and a vaccine of this organism caused a disappearance of the symptoms. The organism gave a markedly positive skin test but animal inoculation was not conclusive. There was no anatomical study.

The other instances of glomerulonephritis associated with the leptothrix likewise have no anatomical study, and there is no reason to ascribe the renal lesion to invasion by this organism.

The cases of invasion of lung parenchyma add little to the discussion of this one. The leptothrix is usually considered as a secondary invader and in Steinberg's (14) instance has been known to metastasize from a pulmonary focus, forming a large "cold" abscess in the periphery.

This instance is unique in the widespread superficial necrotizing involvement of the respiratory tract, the ileum and the anus. The terminal renal disease can not be considered as directly caused by the leptothrix but rather as being "toxic" in nature, more likely associated with the earlier bacterial respiratory infection.

The case is a striking example of the damage which can be caused by an organism which is ordinarily saprophytic, when some unusually favorable factors are present for its propagation and pathogenicity.

BIBLIOGRAPHY

(1) Harris, P. N.: Multiple Liver Abscesses caused by a Leptothrix, with a Review of Leptothrical Infection. Am. J. Path. 9: 71, 1933.

(2) MacKenzie, I.: Pathogenic Leptothricae. System of Bacteriology in Relation to Medicine. Medical Research Council, Great Britain 8: 91, 1931.

(3) Huntemüller, O.: Infectionen durch Trichobakterien. Handbuch der Pathogenen Microörganismen, Kolle u. Wassermann, Ed. 3, 5 (1): 1, 1928.

(4) Bergey, D. H.: A Manual of Determinative Bacteriology. Baltimore, Williams and Wilkins, 1934, p. 495.

(5) Galli-Valerio, B.: Parasitologische Untersuchungen u. Beiträge z. Parasitologischen Technik. Centralbl. f. Bacteriol. 79: 41, 1917.

(6) Mathews, P.: A Case of Localized Empyema associated with the presence of a Leptothrix. Practitioner, 74: 197, 1905.

(7) Roedelius, E., and Brack, E.: Leptothrix Mycose der Zunge. Arch. f. klin. Chir. 141: 1, 1926.

(8) Deussing, R.: Leptothrix Angina mit akuter Glomerulonephritis. Deutsch. med. Wchnschr. 46: 1278, 1920.

(9) Joseph, A.: Leptothricosis Angina. Deutsch. med. Wchnschr. 55: 656, 1929.

(10) Verhoff, F. H., and King, M. J.: Leptothrichosis Conjunctivae (Parinaud's Conjunctivitis); Artificial Cultivation of Leptotriches in 3 or 4 Cases. Arch. Ophth. 9: 701, 1933.

(11) Dick, G. R., Dick, G. F., and Rappaport, B.: A Leptothrix associated with Chronic Hemorrhagic Glomerulonephritis. J. Infect. Dis. 18: 216, 1916.
(12) Thjøtta, T.: Fatal Case of Pneumonia with Empyema and Pyemia, caused by Anaerobic, Gram-negative Leptothrix. Norsk Mag. f. Laegevidensk. 94: 998, 1933.
(13) Nicod, J. S.: Un Leptothrix pathogène pour l'homme; le leptothrix pleuriticus (Rivolta). Ann. d'anat. path. 9: 477, 1932.
(14) Steinberg, U.: Über eine Beobachtung von Leptothrix. Deutsch. Arch. f. klin. Med. 173: 607, 1932.

CONGENITAL POLYCYSTIC KIDNEYS

MARCY L. SUSSMAN, M.D.

[*Department of Radiology* (*Service of Dr. Leopold Jaches*)]

The following case of congenital polycystic kidneys is presented to illustrate its occurrence at an early age and the unusual onset of symptoms as well as to point out the necessity for repeated roentgen examinations where the roentgen findings are not immediately confirmatory of the clinical impression.

CASE REPORT

History (Adm. 386438). The patient entered the hospital for the first time on June 26, 1934, when she was fourteen years of age. Her past history included an appendectomy in 1922, diphtheria and pertussis during infancy, and chicken pox at the age of four years. There was no history of rheumatic fever.

One-half hour before admission she suddenly developed pain in the left temporal region, became weak and lost consciousness. The patient was previously in good health.

Examination. On admission there was an almost complete right hemiplegia, motor and sensory aphasia, diminution of pain, temperature and touch senses over the entire right side of the body, right homonymous hemianopsia, and right pyramidal tract signs. All of these signs and symptoms suggested an occlusion of the left middle cerebral artery.

The signs disappeared rapidly except for a residual very mild right hemiparesis which was more marked on the face and arm. The fundi showed mild retinal sclerosis. By abdomininal palpation both kidneys were found to be enlarged. The heart appeared normal in size. A2 was greater than P2; the first sound was slightly roughened at the apex. Repeated blood pressure readings showed a hypertension varying from 140 systolic and 70 diastolic to 150 systolic and 110 diastolic.

The laboratory findings were as follows: The urine showed a trace of albumin on repeated occasions; there were no casts or red blood cells. A phenolsulphonphthalein test showed a 30 per cent excretion in the first two hours. A concentration test showed a fixed specific gravity between 1.012 and 1.014. The blood Wassermann test was negative. The blood urea nitrogen was 15 mg. per 100 c.c.; sugar 85 per cent; serum albumin 5.6 mg.; serum globulin 2.5 mg.; total protein 8.1 mg. per 100 c.c. The hemoglobin was 65 per cent; red blood cells 4,060,000; leucocytes 8,600 with an essentially normal differential count. The basal metabolic rate was minus 19.

The spinal fluid examination showed the following: the Wassermann test and colloidal gold curve were negative. The fluid was clear and showed five cells per cu.mm. There were 50 mg. of sugar and total proteins 77 mg. per 100 c.c. The pressure was 120 mm.

Electrocardiogram showed evidence of myocardial damage.

Intravenous urography at this time was inconclusive (Fig. 1). The kidneys were demonstrated as being enlarged. The pelves were moderate in size. The calyces showed no distention, retaining their normal cupping. Some of the calyces appeared somewhat compressed, and there appeared

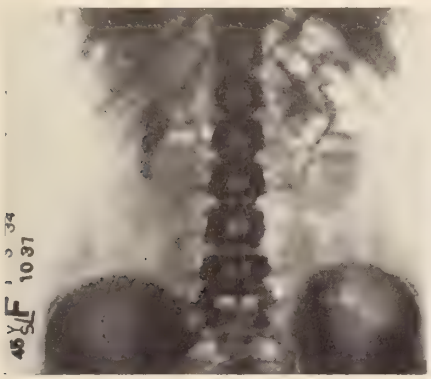


Fig. 1

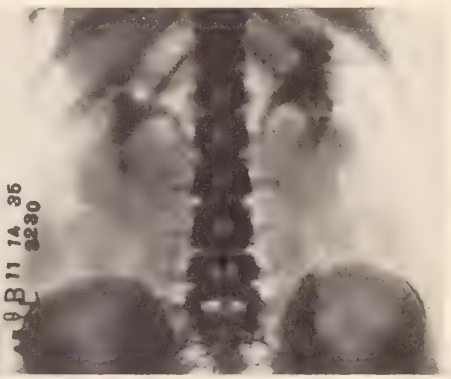


Fig. 2

Fig. 1. July 3, 1934. Intravenous urogram showing enlargement of the left kidney, the contour of which is nodular. The right kidney outline is not well defined. There is a moderate dilatation of the left kidney pelvis and a slight distortion, particularly of the middle calyx. On the right side there is no definitely demonstrable abnormality in the kidney pelvis or calyces.

Fig. 2. November 14, 1935. There is an increase in the size of both kidneys. There is not much change in the left kidney pelvis or calyces except that the distortion of the middle calyx is more marked. There is increase in the size of the right kidney and increase in the size of the pelvis and calyces. There is distortion and compression of the middle calyx. All of the calyces show a slight peculiar cupping, suggesting the presence of multiple masses.

to be an unusually large distance between the lower calyx on the left side and the contour of the kidney which might have suggested the presence of a mass. These abnormalities were noted, however, when the original examination was reviewed, but were not considered sufficiently unusual at the time to warrant a definite statement that a pathological condition was present.

Course. After discharge from the hospital the patient was seen periodically in the follow-up clinic. When seen on October 25, 1934, it was noted that the right hemiparesis had disappeared completely. There was but slight increase in deep reflexes on the right.

Second Admission. The patient was readmitted to the hospital on November 6, 1935. Her complaint at this time was marked palpitation and dyspnea of twenty-four hours duration. She had previously noted moderate dyspnea on exertion but was not incapacitated on account of it. The physical examination at this time showed essentially the same findings as were noted previously. Blood pressure averaged 174 systolic and 100 diastolic. The right kidney was palpable, firm and not tender. The left kidney was markedly enlarged but not tender. The deep reflexes on the right were hyperactive. A Babinksi sign was present on the right. The urine still showed two plus albumin, rare red blood corpuscles and granular casts. The concentration test showed a fixation of specific gravity between 1.012 and 1.015.

Intravenous urography (Fig. 2) at this time showed a much more characteristic picture. The kidneys were enlarged particularly on the left. The pelves and calyces were distended but several of the calyces were compressed in the fashion peculiar to the presence of multiple masses. The hips showed no evidence to suggest renal rickets.

COMMENT

The clinical diagnosis in this case was congenital polycystic kidneys, secondary hypertensive cardiovascular disease, thrombosis of the left middle cerebral artery (old), and sinus tachycardia. The case is unusual in that the onset of symptoms occurred at the early age of 14 years and in the form of cerebral artery thrombosis. The presence of hypertension in a case of congenital polycystic kidneys is a usual finding as G. D. Oppenheimer pointed out in his extensive review of the subject. He also noted, however, that few cases are observed in the first and second decades. The findings by intravenous urography in 1934 are of interest in that they were much less marked than they were a year later. In fact they were sufficiently slight at the former time to warrant a doubt in the diagnosis of polycystic kidneys in spite of the hypertension and obvious renal enlargement.

It is important, therefore, to emphasize the following: (1) That the absence of confirmatory roentgen findings in the presence of a typical clinical picture should not be permitted to negate the clinical diagnosis. It calls for repeated roentgen examinations. (2) That over the course of a year, the cysts in congenital polycystic kidneys may grow sufficiently in size to make the urographic findings much more characteristic.

REFERENCE

Oppenheimer, G. D.: Ann. Surg. 100: 1136, 1934.

ABNORMAL SECRETION FROM THE MAMMARY GLAND FOLLOWING REMOVAL OF A DERMOID AND CORPUS LUTEUM CYST OF THE OVARY

ROBERT WALTER, M.D.

[*Gynecological Service of Dr. Robert T. Frank*]

An increase in the size of the breasts and the presence of colostrum when occurring during the premenstrual period may be considered as physiological, according to Frank (1). However, secretion of milk from the mammary glands of non-pregnant females, though not an uncommon phenomenon, is nevertheless abnormal. Such an anomalous manifestation is now more readily understood since recent hormone studies afford a clearer comprehension of the physiology of lactation.

In 1929 Strücker and Grueter (2) demonstrated a lactogenic factor in crude extracts of the anterior lobe of the hypophysis and were able to initiate lactation even in castrate animals. Riddle, Bates and Dykshorn in 1932 (3) were able to isolate the lactogenic principle from the pituitary in a partially purified form and separated it from the gonadotropic and growth factors. In their experiments preliminary sensitization of the mammary gland with *theelin* and *progestin* was required before lactation could be induced with the lactogenic principle which they called *prolactin*. It had been shown previously by Frank (1) and others that the *female sex hormone* was capable of inducing mammary growth but not lactation.

Clinically, galactorrhea has been noted in such diverse and unrelated conditions as acromegaly (4,5), tabes dorsalis (6), syringomyelia (7,8), craniopharyngeal duct tumor (9), and in postencephalitis (10). It is assumed that abnormal breast secretion in such cases is due to some pathological alteration in the pituitary gland.

CASE REPORT

History (Adm. 384461). The patient was a 26 year old woman, who was admitted to the hospital on September 13, 1935. She had been married for six years and had a child five years of age. This was her first and only pregnancy, which ran a normal course. She breast-fed her child for $8\frac{1}{2}$ months, and lactation was normal. Her menstrual cycle was always normal. The last menstrual period had occurred on August 15, 1935. On several occasions the patient had noticed premenstrual discomfort and swelling of the breasts without secretion. She entered the hospital complaining of a growing pelvic mass which was causing slight

pelvic discomfort and which had increased to twice its original size since first noted five years previously.

Examination. The patient presented the appearance of a healthy young woman, apparently free of endocrine stigmata. Pelvic examination revealed a firm, slightly cystic mass, the size of a grapefruit, in the region of the right adnexa and no other abnormal findings.

The urine was negative. The hemoglobin was 88 per cent. The sedimentation time was three hours. The blood Wassermann test was negative.

Course. A right oophorectomy and appendectomy were performed on September 14, 1935. The tumor removed at operation was represented by a cystic mass which measured 8 by 5 by 4 cm. (see accompanying

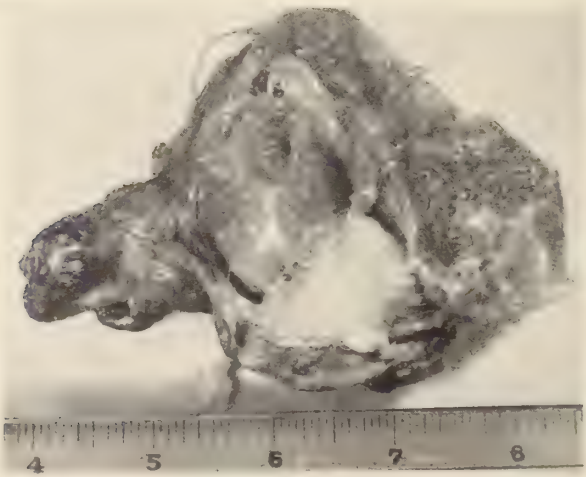


FIG. 1. Cystic mass removed at operation, measuring 8 by 5 by 4 cm.

figure). The wall of the cyst averaged .4 cm. in thickness. A portion of the cyst, 5 by 2 cm. in diameter, was ovarian tissue with one-half of it being a hemorrhagic corpus luteum. The remainder of the specimen contained hair, sebaceous material, and a tooth-like structure.

Four days postoperatively the patient spotted vaginally for one day, coinciding approximately with the expected date of her menstrual period. Four days later both breasts became tender, distended, and a fluid grossly resembling milk, could be readily expressed. The Friedman test at this time was negative. The patient's discomfort was severe enough to require treatment which consisted of a tight binder to the breasts, restriction of fluids, and ice caps. Five days later the secretion had ceased and the breasts returned to almost normal in size.

COMMENT

Although there may have been some physiological disturbance in the pituitary gland to explain the abnormal breast secretion in this patient, there were no other stigmata of pituitary disease. It must also be recalled that some parts of some dermoid cysts may possess physiologically active tissue. Plaut, for example, was able to demonstrate thyroid activity in the tissues of a struma ovarii. It is also a well known fact that a corpus luteum cyst contains both estrin and progestin. Although the dermoid cyst removed from this patient was not assayed for hormone content, it is nevertheless conceivable that the removal of the ovarian tumor (corpus luteum cyst and dermoid) caused a drop in the estrogenic and progestin content of the blood and allowed the lactogenic hormone of the pituitary to act unopposed.

REFERENCES

(1) Frank, R. T.: Female Sex Hormone. Baltimore, Charles C. Thomas, 1929.
(2) Stricker, P., and Grueter, F.: Action of the Anterior Lobe of the Hypophysis on Increased Milk Secretion. Compt. rend. Soc. de Biol. 99: 1978, 1929.
(3) Riddle, O., Bates, R. W., and Dykshorn, S. W.: A New Hormone of the Anterior Pituitary. Proc. Soc. Exper. Biol. & Med. 29: 1211, 1932.
(4) Carnot, P., and Bouttier: Galactorrhea in Acromegaly. Bull. et mém. Soc. méd. d. hôp. de Par. 54: 392, 1930.
(5) del Castillo, E. B., and Lanari, A.: Galactorrhea, Amenorrhea and Acromegaly. Semana méd. 2: 303, 1933.
Krestin, D.: Spontaneous Lactation associated with Enlargement of the Pituitary, with a Report of Two Cases. Lancet 1: 928, 1932.
(6) Thomas, A., and Kudelski, C.: Galactorrhea in a Patient with Tabes Dorsalis. Rev. Neurol. 2: 665, 1932.
(7) Roussy, G., Chastenet de Géry, and Mosinger, M.: Syringomyelia Complicated by Galactorrhea and Uterine Myoma. Rev. Neurol. 1: 521, 1932.
(8) Carnot, P.: Galactorrhea in a Case of Acromegaly; Case Report. Día Méd. 3: 821, 1931.
(9) Salus, F.: Galactorrhea and Tumor of the Craniopharyngeal Canal. Deutsch. Arch. f. klin. Med. 177: 614, 1935.
(10) Riese, W.: Unnatural Secretion of the Mammary Glands due to Disorders of the Mesencephalon, Following Attacks of Epidemic Encephalitis. Klin. Wchnschr. 7: 1954, 1928.

PIAL EPIDERMOID OF THE CHIASMAL REGION

ALICE ROSENSTEIN, M.D.

[*From the Neurological Service of Dr. Israel Strauss and the Division of Laboratories*]

Epidermoid cysts of the brain, often referred to as cholesteatoma or pearly tumors, are sufficiently rare to warrant publication of a single case particularly since it presents some unusual clinical features.

CASE REPORT

History (Adm. 367655). The patient, a white male, 42 years old, entered the Neurological Service of the hospital on June 19, 1934, complaining of progressively failing vision. As a child he had measles and diphtheria. At 12 years of age he had typhoid fever. When he was 31 years old, he was treated at Bellevue Hospital for chronic alcoholism. Two years later he had pneumonia. He had several injuries to the head. When he was 15 years old, he was hit by a trolley car and received superficial wounds on his head. Ten years later, while in the army in the year 1918, he fell from a dirigible but landed in a swamp without apparent injury. It was after this accident that he noted that the vision of his left eye was completely lost. At the age of 27 he was struck by a blackjack without serious sequelae. He smoked excessively and drank a pint or more of hard liquor daily for many years.

The patient was always a carefree, happy-go-lucky individual. He changed his occupation very frequently.

He was uncertain as to when his illness began. He states that only in 1918, at the time of his fall from the dirigible, did he notice the loss of vision in his left eye. The vision of the right eye, however, remained sufficiently unimpaired to permit him to pass army requirements as a sharp-shooter. Aside from the loss of vision in the left eye, he was well and had no other complaints. In February 1934, four months prior to his admission to the hospital, he noticed that vision in the right eye began to cloud and that the field of vision became restricted. This impairment in the right eye progressed steadily. He never suffered from headache.

Examination. General: The patient was somewhat obese, of sturdy build, and of normal intelligence. The examination of the chest and abdomen revealed no findings of importance. The blood pressure was 130 systolic and 90 diastolic. The accessory sinuses were clear.

Neurological: The pupils were unequal, the right greater than the left. The right pupil reacted to light while the left was fixed. There was

consensual light reflex only from right to left. The left eye, which was blind, deviated somewhat outward; there was no muscular weakness and no nystagmus. The fundi showed bilateral primary optic atrophy with the left disc being much paler than the right. The visual acuity of the right eye was 20/50; the left eye was completely blind. The visual field of the right eye showed an incomplete temporal hemianopia associated with a concentric constriction of the nasal side of the field. The sense of smell was impaired on both sides, the left more than the right. There was a suggestive left supranuclear facial weakness. All of the other cranial nerves were intact. The deep reflexes were active throughout with the left knee jerk being somewhat more active than the right. There was a bilateral equivocal plantar response on both sides with an occasional Babinski sign on the left side. There was some diminution of the associated movements of the left side, the left arm swinging less than the right on walking.

Mental: The patient made contacts readily and was on very good terms with everyone in the ward, always ready for a joke. The condition almost approached a state of euphoria. He was free of delusional content and experienced no hallucinations.

Laboratory Data. X-ray examination of the skull showed the sella turcica to be somewhat deeper than normal. The anterior clinoid processes were clearly visualized and were not eroded. The posterior clinoid processes were short and blunted. The floor appeared somewhat depressed into the sphenoid sinuses. The optic foramina were normal in size and shape. There was no evidence of fracture. Urine examination was negative. Blood sugar was 80 mg. per 100 c.c., blood urea 10. The basal metabolic rate was minus 23 and minus 25. The blood and cerebrospinal fluid Wassermann tests were negative. The blood count was within normal limits. The cerebrospinal fluid was clear, colorless, contained only five cells, and was under normal pressure.

Course. At this time the diagnosis of a perichiasmal tumor was regarded as most probable. However, the history of chronic alcoholism and that of a probable trauma to the skull had to be considered before surgical intervention was decided upon.

An encephalography performed on June 29, 1934 showed the lateral ventricles to be well outlined and slightly dilated. The left lateral ventricle showed a filling defect on the floor of the anterior horn with displacement of the foramen of Monro and of the third ventricle posteriorly. The third ventricle was otherwise normal in size and shape.

The encephalogram was not considered very convincing, and it was suggested that foreign protein injections be used as a diagnostic measure. The unusual reactions resulting from several intravenous injections of typhoid vaccine, such as protracted elevation of temperature and excessive headache, were interpreted as indicating the presence of an expanding

intracranial lesion in a cerebral location such as would account for the visual disturbances.

In view of the fact that the previous encephalogram was not very conclusive, it was thought that a ventriculogram would be advisable as it would outline the ventricles more satisfactorily and would disclose changes in front of the third ventricle. A ventriculography was then carried out. It showed dilatation of both lateral ventricles as before. A mass was thought to be pushing the left ventricle upward without lateral displacement. The third ventricle was median in position but irregular in outline. The fourth ventricle was not distinctly seen.

In the meantime the visual acuity of the patient was diminishing and the visual field became more restricted. The diagnosis of a suprachiasmal tumor was made, and a craniotomy was performed by Dr. Ira Cohen. Under local and avertin anesthesia a left frontal flap was turned down. No evidence of increased pressure was noted. A needle was passed into the frontal lobe and at a greater depth a white, flaky substance, resembling talcum powder, appeared in the syringe. On further suction a considerable quantity of this material was drawn out. It was then realized that the nodule was in a cyst underneath the frontal lobe. On elevating the frontal lobe, the olfactory nerve came into view and as its posterior portion was exposed, there appeared the edge of a whitish mass. Further retraction showed that this mass occupied the region immediately in front of the sphenoidal ridge. The wall of the cyst was smooth, shiny and discrete from the brain. On opening, it was found to contain whitish, glittering material, almost like that in a sebaceous cyst. An intracapsular removal was carried out with a curette. The cyst was found to extend inwardly for a depth of about 4 cm. and had imbedded itself in the frontal lobe. Then an attempt was made to pull the floor of the cyst off the floor of the skull, and a considerable amount of this thin material was lifted. An apparent adhesion at one point was then divided by scissors and was followed immediately by a tremendous gush of arterial blood. After some difficulty the bleeding was arrested by clamps and clips but was followed by a considerable venous ooze, evidently from an injured cavernous sinus. A large piece of muscle was removed from the left thigh and implanted into the bleeding bed. This stopped the bleeding effectively. The dura was then completely sutured, the flap replaced and closed, with a drainage tube placed between the sutures of the mesial side of the flap.

In spite of a blood transfusion of 500 c.c., the blood pressure remained between 50 and 60 and the patient's condition on leaving the table was precarious. The patient did not come out of coma. His temperature rose to 107°F., and he died the night following the operation.

NECROPSY FINDINGS

Gross Anatomy. The base of the brain shows a shallow depression in the left frontal lobe and at the tip of the left temporal lobe with the rem-

nants of a shiny membrane, very likely the remains of a cyst wall. There is a large amount of granular material, moderately hard to touch, although friable (cheese-like), spread in the peduncular area (Fig. 1). It encircles both common carotid stumps, the optic chiasm and the cerebral peduncles, along both sides of the pons, infiltrating deep into both Sylvian fissures, and on the right side extending back almost to the cerebello-pontine



FIG. 1. Drawing reconstructing the distribution of the tumor at the base of the brain as it probably existed before the operation.

angle, and on the left closely involving the trigeminal nerve at its exit. Both middle ears are normal.

On sectioning the brain, the tumor tissue is found extending deep into the interpeduncular region encroaching upon the red nucleus, geniculate bodies, and into the right half of the floor of the third ventricle. From there it spreads on to the midline in the direction of the ventral portion

of the dorsal longitudinal fissure and along the wall of the septum pellucidum, causing displacement of that structure to the left, and in this way disturbing the outline of the left lateral ventricle, particularly the anterior portion. It also includes the upper portion of the third ventricle and displaces the latter somewhat to the right. The gross appearance of the tumor was described by Dr. Globus as that of a "Perl Geschwulst" (cholesteatoma). The optic nerves, particularly the left, and the optic chiasma were flattened.

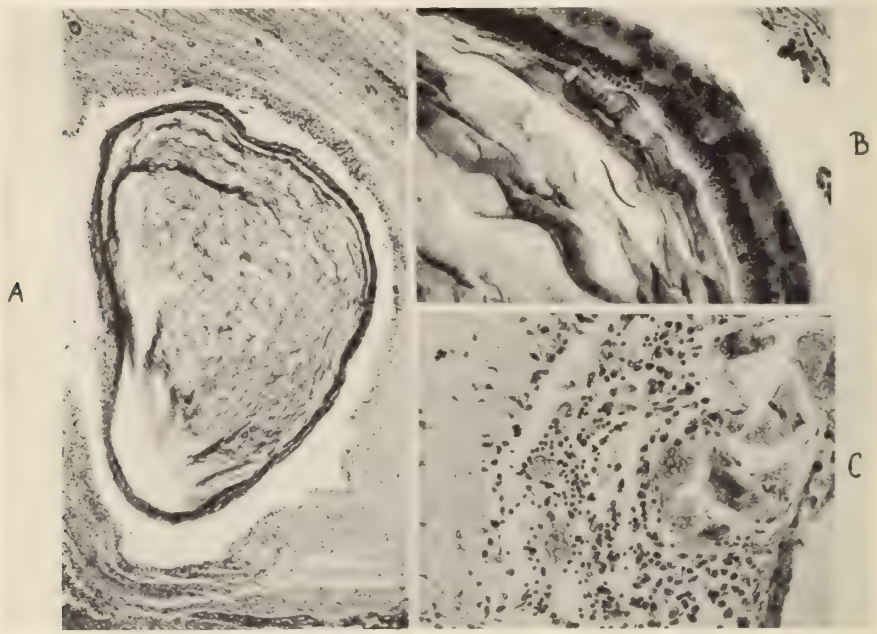


FIG. 2. (A) Small cyst; ×50. (B) Cyst wall and contents; ×310. (C) Cluster of epithelial cells embedded in pia-arachnoid, surrounded by plasma-cells, lymphocytes, and giant cells; ×220.

Microscopic Anatomy. Sections through various portions of the tumor mass show it to consist of many small cysts varying in size (Fig. 2 A), the larger approaching the dimensions of a medium-sized pearl. They are quite discrete and contain large, pale, polyhedral, epithelial cells, most of which are without nuclei; only a few show large, poorly stained cells (Fig. 2 B). The cyst walls consist of several layers of epithelial cells without sharp cell boundaries, the inner layer bearing pigment (Fig. 2 B). Fat stains reveal small deposits of fat drops in the outer layers of the cyst walls. The presence of cholesterin crystals can not be definitely ascertained.

Pal-Weigert stains show extensive dissolution of the myelin structure of

the optic chiasm and optic nerves. The sheaths are thinned, the myelin coagulated to irregular drops, forming rosary-like strings or balloon-like inflations which stain only a pale blue-gray.

The brain substance into which the cysts were more or less firmly imbedded is nowhere affected except for a moderate degree of perivascular infiltration that is to be noted in some areas below the ventricular surface. There are, however, extensive changes in the pia-arachnoid membrane. The latter is markedly thickened and is the seat of a chronic inflammation probably due to the chronic irritation caused by the adjacent cysts. That this cyst material actually acts as foreign bodies is demonstrated by the presence of multinuclear giant cells.

A particularly interesting condition is illustrated by figure 2 C. There are seen clusters of epithelial cells surrounded by rings of lymphocytes, plasma cells and giant cells. These cell groups represent early stages of cyst formation in the pia-arachnoid, a finding of interest because it throws some light on the question of the ultimate origin of these pearly tumors.

COMMENT

The silky sheen of "pearly tumors" did not fail to impress pathologists more than 100 years ago. Nevertheless, the question of their origin and finer histology has not yet been definitely ascertained. Cruveilhier (1829), who was the first to comment on the probable nature and source of origin of these tumors, called them "tumeurs perlées," because of the peculiar shiny surface of the rounded bodies. This terminology was adopted by Virchow in 1855 and by Bailey in 1920. Other authors, among them v. Mueller and v. Remak named them "cholesteatoma", considering the cholesterin content as a more characteristic feature than the pearly luster of the sheaths, which is not always equally impressive. Horrax, in 1922, introduced the term "meningeal cholesteatoma", and Cushing, in 1922, that of "epidermal cholesteatoma". Bostroem, in 1897, spoke of "pial epidermoids", estimating neither the cholesterin content nor the pearly sheen as constant; he felt that they are derived from epithelial cells aberrated between the third and fifth foetal week.

A modern review of the problem was given in 1928 by Critchley and Ferguson who were led to reject Cruveilhier's, Virchow's, and Bailey's name of "pearly tumor", arguing that the sheen may be poor or missing (it fades in formalin), or that, on the other hand, tumors of quite different structure may display a similar sheen, and finally that a term applying to one single macroscopic feature is undesirably non-committal. They have equally strong objections against the widely accepted name "cholesteatoma", as the presence of cholesterin is neither constant nor significant, and furthermore because the name of cholesteatoma is being used for several groups of entirely heterogenic growths, ranging from the

tumor of the bone of the skull to the inflammatory products of chronic otitis (for which they suggest the name of "cholesteatosis"), and including even the intraventricular growths of horses. Critchley and Ferguson refer, therefore, to the tumors here in question as to "cerebrospinal epidermoids", considering the occasional presence of hair, sebaceous glands and horny cells as an analogy to the strata of the skin and a good evidence for the epidermal origin.

This view is not out of accord with a recent contribution by Globus on the subject of primary neoplasms of the meninges, the so-called meningioma. He called attention to the fact that in early stages of development of the brain coverings the epidermis and meningeal structures are close neighbors. At such times a cluster of primordial epidermal epithelial elements may easily become separated from its own matrix and may become enclosed in that which later develops as a dura or pia-arachnoid. Globus feels that such aberrant epithelial islands are responsible for the existence of such tumors described as pial epidermoids. The findings illustrated in figure 2 C speak strongly in favor of this theory.

Up to 1933 none of the epidermoids had been diagnosed as such during life. Not infrequently has their presence remained unsuspected. The diagnosis is exceedingly difficult, since there are practically no distinguishing features. In this case it was particularly so because of the relative lack of symptoms and because of the history of serious traumas to the head and the history of steady abuse of liquor and tobacco which suggested the possibility of either a traumatic or toxic encephalopathy. The presence of a tumor was considered, however, on the basis of the X-ray studies of the skull: the disfiguration of the sella turcica and the enlargement and displacement of the ventricles after ventriculography. In 1933 one case was correctly diagnosed preoperatively. The tumor, however, was not one of the chiasmal group but was situated in the fourth ventricle. The diagnosis was made on finding characteristic tumor cells in the spinal fluid. (Nagel, 1933. Female, 40 years old, cerebellar symptoms. Cerebrospinal fluid, obtained by ventriculography, revealed cholesterin crystals and several clusters of 5 to 6 large pale cells without nuclei.) Since most of the pearly tumors communicate with the spinal fluid and since it is quite probable that the small cysts burst occasionally, it is probable that the fluid may contain the cyst's contents, i.e., hornified cells, crystals, or even hair. It is thus advisable to search the cerebrospinal fluid carefully for tumor cells. The method adopted in this hospital is to centrifuge the spinal fluid in a pointed tube, to embed the centrifuged sediment in paraffin, cut and stain with hematoxylin-eosin or other dyes.

I wish to express my thanks to Dr. Joseph H. Globus for his valuable assistance and supervision in the preparation of this report.

REFERENCES

Bailey, P.: Cruveilhier's "Tumeurs perlées." Surg. Gynec. & Obst. 31: 390, 1920. Further Observations on Pearly Tumors. Arch. Surg. 8: 524, 1924.

Bauditz, P.: Epidermoids of the Brain. Ztschr. f. d. ges. Neurol. u. Psychiat. 144: 135, 1933.

Bostroem, E.: Ueber die pialen Epidermoide, Dermoide und Lipome und die duralen Dermoide. Zentralbl. f. allg. Path. u. path. Anat. 8: 1, 1897.

Critchley, M., and Ferguson, F. R.: Cerebrospinal Epidermoids (Cholesteatomata). Brain 51: 334, 1928.

Cushing, H.: A large Epidermal Cholesteatoma of the Parieto-Temporal Region, deforming the left Hemisphere without Cerebral Symptoms. Surg., Gynec. & Obst. 34: 557, 1922.

Forster, E.: Ueber das Liquorzellbild bei organischen Nervenkrankheiten. Ztschr. f. d. ges. Neurol. u. Psychiat. 139: 161, 1932.

Globus, J. H.: The Meningiomas. Their Origin, Divergence in Structure, and their Relationship to Contiguous Tissues in the Light of the Phylogenesis and Ontogenesis of the Meninges; with a Suggestion of a Simplified Classification of Meningeal Neoplasms. Tr. Ass. Res. Nerv. & Ment. Dis. 1936; Arch. Neurol. & Psychiat. In press.

Hoffmann, P.: Ueber Epilepsie bei rechtsseitigem Schlaefenlappentumor; zugleich ein Beitrag zur Kasuistik der Cholesteatome des Gehirns. Allg. Ztschr. f. Psychiat. 101: 397, 1934.

Kahler, O.: Zur Kenntnis der primaeren Cholesteatome des Stirnbeins. Ztschr. f. Laryngol., Rhinol. u. Otol. 23: 227, 1932.

Kay, F. A., and Pack, G. T.: Cholesteatoma of the Brain; Report of Tumor of Unusual Size. Arch. Neurol. & Psychiat. 19: 446, 1928.

Langeron, L.: Cholesteatoma of the Brain. J. de méd. de Lyon 12: 149, 1931.

Langeron, L., and Le Grand, A.: Cholesteatoma at the Base of the Brain with Symptoms of Pontocerebellar Tumor. Bull. et mém. Soc. méd. d. hôp. de Par. 52: 1570, 1928.

Lautenschlaeger, A.: Zur Genese und Morphologie des Cholesteatoms. Klin. Wchnschr. 9: 599, 1930.

Loehr, W., and Jacobi, W.: Mannsfaustgrosses durch Operation geheiltes Cholesteatom der mittleren Schaedelgrube. Zentralbl. f. Chir. 60: 1875, 1933.

Love, J. G.: Pearly Tumor (Epidermoid) of the Lateral Ventricle; Complete Removal with Recovery. Proc. Staff Meet., Mayo Clin. 11: 40, 1936.

Lucke, B. H., and Landon, L. H.: Cholesteatoma Basis Cerebri. Proc. Path. Soc., Philadelphia 37: 6, 1917.

Montgomery, G. L., and Finlayson, D. I. C.: Cholesteatoma of Middle and Posterior Cranial Fossae. Brain 57: 177, 1934.

Nagel, F.: Beitrag zur Liquorzelldiagnostik. Ein Fall von Hirn Cholesteatom. Nervenarzt 6: 197, 1933.

Neer, E. D.: Cholesteatomata. S. Clin. North America 9: 767, 1929.

Nowotny, H.: Zur Frage des Substitutionsmechanismus von Gehirnfunktionen. Med. Klin. 28: 1273, 1932.

Olivecrona, H.: Suprasellar Cholesteatomata. Brain 55: 122, 1932.

Parker, R. H.: Etiology and Pathology of Cholesteatomata. J. Iowa State M. Soc. 18: 252, 1928.

Rywkind, A. W.: Beitrag zur Pathologie der Cholesteatome. Virchows Arch. f. path. Anat. 283: 13, 1932.

Schroeder, A. H.: Medullary Cholesteatoma Causing Compression of Spinal Cord. An. Fac. de méd., Montevideo 17: 591, 1932.

Strauss, I.: Cholesteatoma of the Brain. J. Nerv. & Ment. Dis. 40: 257, 1913.

THE RELATION OF VARIOUS FACTORS TO THE ONSET OF CORONARY ARTERY THROMBOSIS[1]

ARTHUR M. MASTER, M.D., SIMON DACK, M.D., AND HARRY L. JAFFE, M.D.

From the Medical Services and the Cardiographic Laboratory

It is a common belief that coronary thrombosis, like angina pectoris, is found more often among the business and professional classes and in association with physical or emotional strain. But during several years' investigation of coronary thrombosis we have been impressed by the differences between these two syndromes. It was noted that, as a rule, angina was preceded by unusual exertion or excitement, whereas attacks of coronary thrombosis occurred without apparent cause, a finding illustrated by the following cases of proved thrombosis:

Case I (*397405), a house painter 55 years of age, had never complained of angina pectoris or dyspnea. One evening he went to bed as usual, feeling well. At 4 A.M. the following morning he was awakened from sleep with severe precordial pain.

Case II (*374672), a woman lecturer aged 52 years, went to bed feeling perfectly well. Soon after, before falling asleep, she was seized with severe substernal pain.

Case III (*362693), an iron worker aged 50 years, who had always been in good health, one morning while getting out of bed experienced substernal pressure. Nevertheless, he dressed and started for work. As the pain steadily increased in severity, he was forced to return home.

Case IV (*373540), a travelling salesman aged 48 years and previously in excellent health, while driving his automobile in his customary manner, suddenly developed severe pain.

Case V (*398332), a 50 year old housewife who was known to have had hypertension for seven years, was subject to occasional slight precordial pain on exertion. Early one afternoon while slowly walking along the street, she was seized with severe substernal pain and collapsed.

Case VI (*397021), a presser 49 years of age, had experienced attacks of dyspnea on moderate exertion for several years. One morning (9 A.M.) at the end of an hour's work he suddenly developed agonizing precordial pain.

We have analyzed 620 attacks of coronary artery thrombosis which occurred in 394 patients who were seen in this hospital during the period

[1] Read at The Mount Sinai Hospital, New York, October 20, 1936, during the Graduate Fortnight of the New York Academy of Medicine.

from 1930 to 1936. Of these patients 308 were males and 86 females. The incidence of attacks was most frequent in the sixth and seventh decades. In most of the cases the attacks were observed by us personally; the remainder included only those in which definite statements were made in regard to the onset of the attack.

The occupation was tabulated in 385 cases (Table 1). Of the men 58.5 per cent were unskilled laborers, tailors, pressers, iron workers, printers, chauffeurs, peddlers and other manual workers, although 41.5 per

TABLE 1

Occupation in 385 Cases of Coronary Artery Thrombosis

	NUMBER	INCIDENCE
		per cent
Male	299	
Working class	175	58.5
Storekeepers	23	7.5
Office workers	44	14.7
Business men	20	6.5
Professional men	17	5.5
None or retired	20	7.0
Female	86	
Housewives	82	95.0
Professional	4	5.0

TABLE 2

Period of Day at Onset of 306 Attacks of Coronary Artery Thrombosis

PERIOD OF DAY	ATTACKS	INCIDENCE
		per cent
Morning, 7 A.M.–1 P.M.	94	30.7
Afternoon, 1 P.M.–7 P.M.	68	22.2
Evening, 7 P.M.–1 A.M.	60	19.6
Night, 1 A.M.–7 A.M.	84	27.4
Day, 7 A.M.–7 P.M.	162	53.0
Night, 7 P.M.–7 A.M.	144	47.0

cent were storekeepers, office workers, business and professional men. In the group of females all except four professional women were housewives. Since our series consists predominantly of free ward patients, the high percentage of workers is not indicative of the fact that coronary thrombosis is more prevalent in this group, but it does prove that the disease occurs among the laboring as well as the executive class.

The time of day at which the attack of thrombosis began was determined in 306 attacks (Table 2). The incidence during the day, that is from 7

A.M. to 7 P.M., differed little from that during the night and therefore it may be concluded that exertion played little part in the initiation of attacks. When the day is divided into quarterly periods (Table 2), there is a slight increase during the periods 7 A.M. to 1 P.M. and 1 A.M. to 7 A.M. but it seems too small to be significant.

TABLE 3

Factors Associated with the Onset of 452 Attacks of Coronary Artery Thrombosis

	ATTACKS	INCIDENCE
		per cent
Rest	94	20.8
Sleep	86	19.0
Walking	81	18.0
Mild activity	61	13.5
Moderate activity	21	4.6
Unusual or severe exertion	4	0.9
Trauma	0	0
During or after a meal	22	4.8
Excitement	25	5.5
Post-operative	31	6.8
Infection	10	2.2
Increasing angina pectoris	9	2.0
Silent coronary thrombosis	8	1.7

TABLE 4

Onset of Coronary Artery Thrombosis in 463 Attacks. Seasonal Incidence 1930–1936

	ATTACKS	INCIDENCE
		per cent
Winter, January, February, March	126	27.2
Spring, April, May, June	112	24.2
Summer, July, August, September	114	24.6
Autumn, October, November, December	111	24.0
Autumn–Winter, October–April	237	51.2
Spring–Summer, April–October	226	48.8

An analysis of the circumstances attending the onset of 452 attacks yielded the information (Table 3) that 20.8 per cent occurred while at rest, 19 per cent during sleep, 18 per cent while walking, 13.5 per cent during mild activity, 4.6 per cent during moderate activity, 0.9 per cent with unusual or severe exertion, 4.8 per cent during or after a meal, 5.5 per cent during excitement, 6.8 per cent post-operative and 2.2 per cent following infection. The remaining 3.7 per cent comprised 8 cases in which the thrombosis was unattended by any symptoms and 9 cases char-

acterized merely by an increase in the frequency and severity of a pre-existing anginal syndrome.

The largest number of attacks, almost 21 per cent, developed during rest, that is, while the patient was mentally and physically relaxed, lying down or sitting up. Nineteen per cent of the attacks occurred during sleep. Rest and sleep, therefore, accounted for two-fifths of the attacks. At first glance this appears to be a large group and suggests that rest and sleep predispose to the formation of a thrombus, but it must be remembered that one-third of the day is consumed in sleeping and at least one-fifth more in some form of physical inactivity. Hence, if rest and sleep were predisposing factors the incidence of coronary artery thrombosis in these two states would be over 50 per cent. As we have seen, it is actually 40 per cent. We believe, therefore, that there is no relation between rest or sleep and coronary thrombosis. Similarly, although 18 per cent of attacks occurred while walking, there is probably no relationship between walking and the onset of attacks since at least one-fifth of the day is normally spent in this form of activity. Moreover, most of the patients who developed attacks while walking were moving about without undue exertion.

Under mild activity we have included the ordinary domestic, social and business activities, for example, conversing, dressing and sitting in the office. Of the total number of attacks 13.5 per cent occurred under such circumstances, a proportion too small to be of significance since the activities in this classification are numerous and routine.

In the moderate exertion group, within which 4.6 per cent of the patients fell, the activities included the work of unskilled laborers, such as painting, engineering and carpentry, and straining at stool; under severe or unusual exertion with 0.9 per cent of the patients, were listed activities such as running for a train, skating, dancing. It should be remembered, however, that even a sedentary person occasionally engages in severe effort, and that considerable exertion was habitual in the course of their occupation in many patients in our series. If such activities had been a precipitating factor, the incidence of coronary thrombosis would have been higher.

It is commonly believed that excitement and the ingestion of food initiate many attacks of coronary thrombosis; yet in our series the incidence for these factors was 5.5 per cent and 4.8 per cent respectively. These figures are so low as to indicate that excitement and eating were little more than a coincidence. Moreover, periods of excitement or emotional stress are quite common occurrences during one's life.

In only 2.2 per cent of cases was there any evidence of infection preceding the attack, and in these instances the infection was of the upper respiratory tract.

On the other hand we believe that the occurrence of 6.8 per cent of

attacks following operation is significant, for thrombosis was not found to take place on the medical wards where patients were in bed often for long periods and secondly, the majority of attacks occurred within three days of the operation.

An attempt was also made to determine the relation of smoking and drinking to coronary thrombosis. It was found that 52 per cent of males never drank alcohol and only 4.5 per cent were heavy drinkers. Only one attack followed a bout of drinking. Similarly, 26 per cent of the men gave a history of never having smoked and 40 per cent had smoked over fifteen cigarettes daily. Therefore, it appears that neither alcohol nor tobacco was important in contributing to attacks of coronary thrombosis, for these figures are approximately the same as those for the general population.

Sixty-nine of the patients were diabetics and twenty of these had taken insulin for long periods prior to the thrombosis. One patient began to receive insulin for the first time several days prior to sustaining an occlusion which followed an eye operation. As in the other cases, however, the circumstances attending the occlusion did not suggest a relationship to the insulin. This subject requires further investigation.

Finally, the effect of season on the incidence of coronary thrombosis was studied. It has been supposed to be much more common in cold weather but we found (Table 4) that the number of attacks occurring in autumn and winter was not significantly greater than that in spring and summer. Similarly, the incidence in each quarterly period was approximately equal.

CONCLUSION

From the data presented it is reasonable to conclude that, unlike angina pectoris which generally follows exertion or excitement, there is no one factor or group of factors responsible for the onset of an attack of coronary thrombosis. It may develop during the patient's routine of daily life, and the apparent association of an attack with some external condition is merely coincidental.

THE MOUNT SINAI HOSPITAL AND ITS SURGEONS OF THE MIDDLE EIGHTIES; A FEW RECOLLECTIONS

HOWARD LILIENTHAL, M.D.

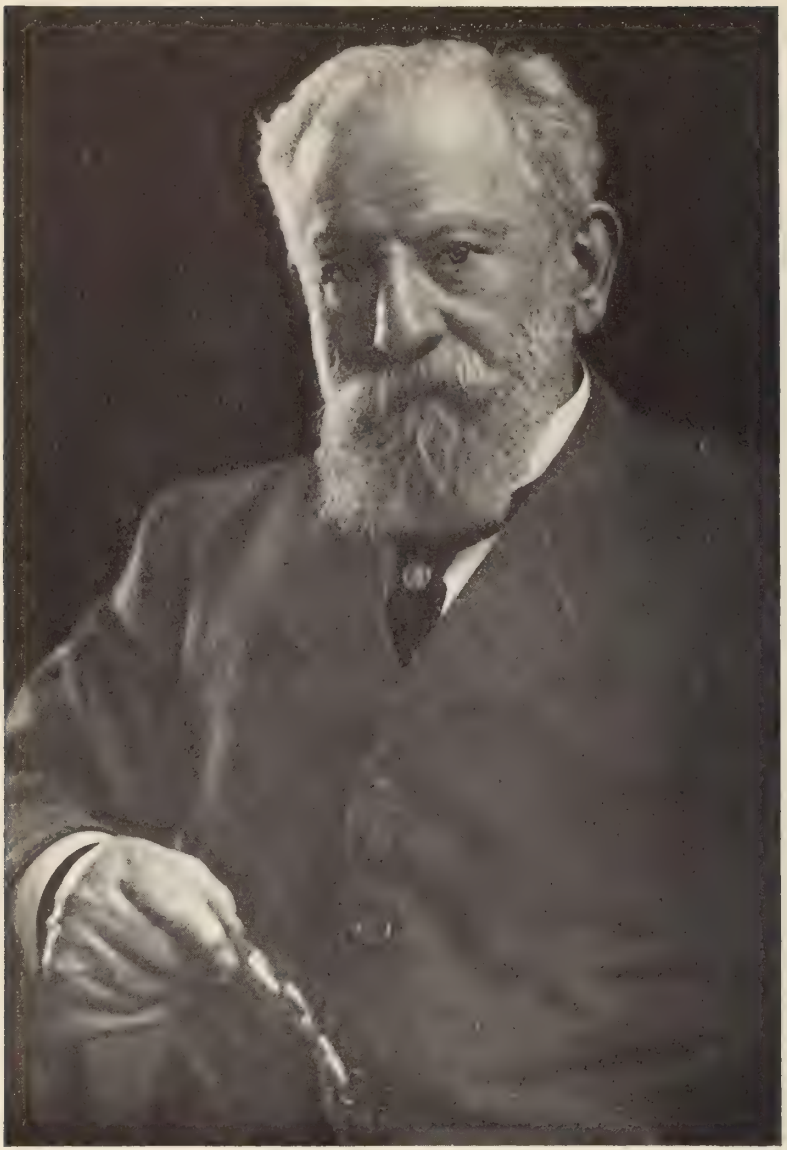
[*New York City*]

It was my good fortune to stand first in the examination for the House Staff and when I expressed a preference for the surgical service I found that I had committed what seemed to be the equivalent of a social error for, apparently, no one had ever thus slighted the medical departments. It was not, however, disrespect for Medicine but sincere love for Surgery and I have never regretted my choice.

On Lexington Avenue occupying the block between Sixty-sixth and Sixty-seventh streets stood the red brick white-trimmed building with its blue window-shades flanked by side panes of cobalt glass. The south wing was for male patients and the north for female. Between these wings, along the Avenue, were the executive offices and a small private-patient department known as The Middle House. In addition to the usual Medical and Surgical departments there was an Eye, Ear, Nose and Throat service with Dr. Emil Gruening, dignified and venerable, as its ruler. On my arrival as Junior-Provisional on the House Staff the memory of the first mastoid operation, performed by him, was still vivid and Mount Sinai became renowned for its early development of this new branch.

To see Gruening extract a cataract was something never to be forgotten. Cocaine, a gift to the world by our own Carl Koller, was not employed when the case was that of an obstreperous patient, chloroform being then given the preference. The Graefe knife was held in the mouth of the operator, its ivory handle projecting from the right, the keen blade from the left, barely missing the gray beard and the luxuriant moustache. The local preparations of the operative field were made: the scrubbing and irrigation of the conjunctival sac, the insertion of the speculum. The corneal section was then skillfully executed and the knife at once conveniently replaced. The cystotome divided the capsule, usually after iridectomy, the lens was extracted and the bandage applied. Through it all, gentle quiet conversation went on defying what would ordinarily be regarded as an impediment to speech.

Although there had been apparent disregard of asepsis or antisepsis not a single case of infection was observed by me. Gruening actually antedated Arbuthnot Lane in the details of aseptic procedure for no contaminated object ever entered the field of operation. In mastoidectomy,



E. Greening

on the contrary, where this rule was not followed infection was common enough, especially erysipelas, not even in our day completely eliminated.



Wm. F. Fluhrer

Four members composed the Attending Staff of the Division of General Surgery. These were Dr. W. F. Fluhrer, Dr. Daniel M. Stimson, Dr. John A. Wyeth and Dr. Arpad G. Gerster. The gynecological depart-

ment was in charge of Dr. Paul F. Mundé. All have now gone, each one leaving a lasting influence through those who worked under him and on through the succeeding generations of scientific posterity. To attempt even in a desultory way to draw the character portraits of these eminent men would occupy the pages of several numbers of this journal. Let me, therefore, present a brief outline of each as he impressed me in my early days.

Fluhrer: A tall, handsome, graying-bearded serious individual. His technique was exact to a meticulous degree and hours were often spent in operating upon a single profoundly etherized patient. There was no apparent anxiety and the quiet calm of the surgeon was truly remarkable. If lunch-time came the procedure was intermitted while the operator refreshed himself with a sandwich and a cup of coffee in the operating room, the anesthetist meanwhile keeping the patient lightly "under." Antisepsis was rudimentary; no gloves, no boiling and the simplest type of hand and instrument scrubbing with the subsequent application of bichloride to the hands and arms. The instruments were immersed in a bath of 5 per cent carbolic. The sequence of dirty cases following clean was observed whenever possible and, after any particularly septic case our operating room (there was but one) was sprayed for hours or, better still, all night with carbolic. In spite of this asepsis-in-name-only there were few dangerous post-operative infections.

Fluhrer was a master of old-fashioned surgery with its mechanical principles of drainage from the "lowest" point. In operating for fractured patella, in which he was one of the pioneers, he had amazing success and not even the modern methods can achieve more perfect asepsis. Here, as in Gruening's work, Lane was forestalled, for the hands never entered the wound. Constant irrigation with bichloride was the rule throughout the operation and, though the bone fragments were drilled, the instrument employed was one which Fluhrer had devised; a one-piece flexible steel wire-like drill with a terminal crochet-hook—no eye. The silver wire suture, about number eighteen, had been tapered to a fine thread-like end which was drawn through the bone by hooking it into the crotch of the instrument, and its thicker part was used as the suture. Fluhrer had reported the histories of more than thirty patients with primary union and no failures of asepsis.

Dr. Fluhrer was an expert in the use of the probe, and was the first to devise one of aluminum for special use in operations upon the brain. The price of this probe in those days was about nine dollars. When boiling in soda came into vogue so many aluminum probes dissolved in the sterilizer that this valuable instrument is now almost extinct. I am glad to have learned from him the use of probes bent in the form of an S with the middle portion straight in nicely demonstrating tortuous channels.

An anecdote follows, illustrating what can be done with perfect technical surgery and no attempt at asepsis: In my first year of practice there was a case of impassable stricture of the deep urethra in which I had asked Dr. Fluhrer to be present to share responsibility and to lend a hand if necessary. A filiform bougie was passed as far as it would go



Daniel Stimson, M.D.

and then perineal section was undertaken by me. Things went too slowly and finally Fluhrer took the knife. Believe it or not, he sharpened the blade on his shoe and with a few swift strokes the urethra was entered. There was no postoperative complication. The wound, of course, was left wide open, and the perfect drainage took care of possible contamination.

Stimson: Surgeon of the Seventh Regiment, Daniel Stimson was, above all, military. When he made rounds his communications were solely with the house officer in command and no other member of the staff was

in existence. If the care of a patient including the dressing of his wound had been assigned to one other than the House no questions were asked of him and no remarks were noted save those of the House Surgeon. Should there have been an error or misstatement by the House and the junior in charge ventured to correct it, he would be squelched by a look—never by word of mouth; nor would any attention be paid, apparently, to the message conveyed. Rounds over, there would be a consultation of the Attending and the House in the presence of the hushed staff and after the visit the offending junior would receive a reprimand from his superior. No doubt this military ceremony had advantages in maintaining discipline in the wards but it was most discouraging to an overzealous junior.

Dr. Stimson, off-stage, was a gentleman in every sense and no longer the martinet of rounds. He treated those who served him with dignified politeness and generosity. His house was in the neighborhood of East Tenth Street and on arriving at Sixty-seventh Street for his hospital visit he invariably gave a tip to his own coachman who had driven the polished and beautiful brougham with its steel tires and silver lamps. Our operating-room orderly watched this ceremony with envy and brought to my attention the half-dollar gratuity easily observed from the front window of the operating-room. This orderly, William, who had long been in charge of the equipment and management of surgical affairs possessed all the requisites of his important position. He quickly learned the care of new apparatus and how it should be applied. He took genuine pride in the duties of his office. He was a tall, blond, powerful man, his hair brushed back and bristling from an intellectual face. His death was untimely and followed an operation for an acute exacerbation of a chronic suppurative appendicitis. At his funeral from the Hospital my friend, the late Dr. Sam Brickner, made a touching speech in the form of an address to William himself. I shall not forget this affecting formality.

As an operator Stimson was careful and painstaking but often seemingly timid unless the case were one of those in which typical procedures had been developed in the pre-anesthetic days of breathless speed. It was always inexplicable how the same man who slowly and deliberately exposed the deep axillary structures would perform lateral perineal lithotomy by a few lightning strokes of the scalpel with not a single vessel caught until the stone had been extracted, about 45 seconds following the beginning of the surgical attack—an expression especially felicitous in its description.

Wyeth: The New York Polyclinic, founded and directed by John A. Wyeth, was the pet—no other word for it—of this important surgeon, and writer of both professional articles and of popular historical stories about the Civil War. He was author of a single-volume work on general surgery which became the text-book of the Polyclinic. Dissections of

the neck by Wyeth were painstaking and were beautiful to observe. His anatomical descriptions of the great vessels of this region still remain



John Allan Wyeth

among the classics and are to be found in modern reference literature. I have the impression that Dr. Wyeth's notes on the thoracic vessels are also frequently quoted.

It is far from easy to draw a portrait of this tall, blond, suave southerner who never used an abrupt expression, who quietly described to his class the operation he was performing, and who made it all appear so easy that any graduate in medicine, no matter how recent, would feel that he himself could accomplish what his revered teacher was doing with such ease and sang froid.

Operations upon the extremities were characterized by fear of hemorrhage to a much greater degree than at present, and Esmarch's constricting bandage was extensively employed. Amputations through the upper part of the thigh and at the hip joint were especially perilous and Wyeth conceived the idea of fixing the rubber bandage behind long hat-pins which were the usual appliances for keeping women's head-gear in place. (In the eighties and early nineties they were not infrequently pressed into service as feminine weapons of defence or even of offence.) Two of these pins were passed through the soft parts of the limb at the hip, crossing each other, the esmarch was applied above these and was thus prevented from slipping. To make sure that a possible retraction of the severed great vessels should not provoke fatal hemorrhage, an assistant pressed his thumbs in the groin to compress the femoral artery. The amputation then proceeded with quick strokes of the long knife. I never saw one of these arteries escape from the constrictor, but I have an impression that it has happened. At any rate, to make sure that the pins should not bend Wyeth had special steel ones made by Tiemann.

Dr. Wyeth's operative clinics, though given for students of the "Poly," were open to all comers and were very popular. Asepsis as now understood did not exist. The operator wore no gown, but merely divested himself of as much of his attire as seemed necessary for its protection.* Illustrating his calmness under stress let me recount an instance. One of Dr. Wyeth's most important Southern patients, a middle-aged man, was being carried from the operating-room after a major procedure on the genito-urinary tract. He was still soundly etherized, and the stretcher without wheels, carried by two orderlies, tilted and there was a crash to the tiled floor. I know what general expressions of emotion would have been voiced had I been the surgeon, but all Wyeth said was "Isn't that too bad." We were forbidden to mention the incident because talking about it could do no good. Fortunately, a bruise on the temple was the only visible result of the accident; a case of "Least said, soonest mended."

Gerster: This truly great surgeon and cultured man cannot be delineated without in some way indicating his peculiarities of speech, including its rich Hungarian brogue, if it may thus be characterized. He was a writer of impressive descriptive literature, both general and scientific,

* There was no amphitheatre, although a large room of this type in the top story of the hospital was used very rarely for lectures.

a musician in the true sense – that of intimate knowledge and appreciation; an amateur etcher and a painter in oils. His manner of emphasizing his orders to the House Staff was sometimes little short of cruel, but it resulted in holding their attention and in having his orders promptly



Jerad G. Gerster

enforced. Rough in his dealings with many he was the essence of kindness and true charity to the patients in the wards. I often wondered how he could hold his private Middle-House clientele in spite of his bluntness of expression and his faintly disguised ridicule. It must have been

the confidence in him as a surgeon and as a person of recognized superlative honesty.

Of all the Attending Staff at Mount Sinai he was pre-eminently the one who taught actual asepsis as well as antisepsis. It was his book on this subject — the first, I believe, published in New York, perhaps in America— which popularized the modern ways of operating and of after-care. It was an unusually attractive volume, clinical for the most part, and illustrated by half-tone pictures from photographs made by Gerster himself in the operating-room. With the old-fashioned glass plates instead of films this required patience and experience.

Gerster was the first of the Attending surgeons with whom I came in contact. He was so very different from the teachers I had met in the Medical School that I did not know quite how to appraise him; how much he really meant of what he said. His first question contained an implication that I had not been properly instructed in the principles of asepsis, even though I had come from Harvard which to me was a holy place; so I was rubbed the wrong way. He had to be convinced that I knew and then there was little more to be said on that point. His manner was terrifying with its aggressive military bearing. I shall always remember his long black frock coat which, when the tails were separated, revealed an instrument-pouch strapped so that it lay in the lower hollow of his back. It was of ample proportions and held a supply of hardware which seemed enough for carrying out a major operative procedure. Gerster was proud of his selection of instruments and delighted to display them to those interested. A sharp spoon was his favorite tool, probably because he regarded this as an especially valuable though usually neglected piece in the armamentarium. Osteomyelitis, tuberculous in type, seems to me to have been much commoner then than it is today, and the wide exposure of bone cavities with the "scraping out"—we didn't call it curettage when bone was concerned—of these great spaces was an essential step.

During operations Gerster gave out a torrent of information, description and anecdote. His expressions were forcible, often unique, and always of high educational value, but I never heard him employ profanity nor even the slang of the period. There was all the emphasis of cursing with none of its useless vulgarity. Later on I spoke with him about profane swearing, and he said that the English vocabulary was too limited to make this method of expression worth while. In Hungarian one could really curse with effect.

This outstanding surgeon in action presented a veritable spectacle. Speed was combined with a beauty and accuracy which I have never seen equalled. One day, during a dissection of the neck, early in my term of service, I became alarmed lest the location of the great vessels be ignored, and I ventured a note of modest warning. This excited no drastic comment but, strangely enough, the mere assurance that I need give myself no uneasiness for the anatomy had not been overlooked.

Nothing deterred him from an attempt at cure by surgery even in cases which had been regarded by others as hopeless; and success followed often enough to make a lasting impression on me. Later, when I had left the



Paul F. Mundé, M.D.

Hospital, it was my good fortune to receive the appointment of assistant in Gerster's practice and I became well acquainted with his personality and his many interests, artistic, musical and literary. During this association I saw him develop as an etcher and, to a less degree, as a painter.

His devotion to our American wild country was an absorbing passion and he became a skilled fisherman and hunter of big game. He now lies in his final resting-place in his beloved Adirondack Mountains.

Mundé: King of the department of gynecology, Paul F. Mundé, with his magnificent presence and regal carriage, was affectionately admired by patients, nurses and House Staff alike. He was informal to a degree. For example, when a patient had to be taken from her bed to the examining room at the end of the long ward he seldom waited for the stretcher but carried her in his powerful arms as if she were a child, depositing her upon the table with the greatest gentleness.

He was a brilliant operator in the methods of long ago and at the same time he was never afraid to acknowledge the possibility of error in judgment or technique, and always welcomed the advice or suggestions of others. His clinics were attended by many representative visitors and the scene at the beginning of the session was, indeed, striking. The room had been prepared and the space for visitors roped off. The patient was placed upon the table in the correct posture. The anesthesia was managed by a member of the House Staff with the barbaric open ether inhaler. At the slightest sign of reaction the ether was pushed almost to the drowning point. For pelvic work through the vagina the Sims position was usual, and I seldom saw a speculum of any other pattern than that of the founder of modern gynecology. Everything in readiness, Mundé stripped to the waist, except for a short sleeved thin undershirt far from concealing his splendid torso, his trousers covered by a rubber apron, entered the arena under the ropes the veritable picture of a superb prize-fighter. Throughout the entire clinic Mundé kept up a conversation with House Staff and visitors which, with the appearance of technical difficulties, became less and less obtrusive until, in a grave emergency, there was silence. The performance concluded, there was a justly proud presentation of the result and an explanation of the manner in which difficulties had been overcome. In his passing, only a few years following my graduation, I lost a sincere friend.

Although these notes have dealt only with high dignitaries of the Attending Staff I shall surely be forgiven for introducing the name of the first House Surgeon under whom I served, the late William Holland Wilmer, a fine, scholarly man. After his course at Mount Sinai he became the pupil and assistant of Dr. Gruening and in two or three years he established himself in Washington where he quickly rose to eminence. The Ophthalmic Institute at Johns Hopkins was founded in his honor and bears his name.

Reminiscences are rarely interesting except to those who were themselves a part of the scene. These notes are therefor brief and fragmentary. They are meant to present the ground colors and a few high lights, rather than a detailed picture.

CLINICAL PATHOLOGICAL CONFERENCES

GEORGE BAEHR, M.D., AND PAUL KLEMPERER, M.D., *presiding*

Wednesday, January 15, 1936

Case 1. Bilateral calculous pyonephrosis (From the Surgical Service of Dr. Edwin Beer)

History (Adm. 387953). The patient, a 46 year old diabetic male, was first admitted to the hospital in January 1935. In 1932 he underwent a cystolithotomy at another hospital for vesical calculi. For the eight months preceding his recent admission, he experienced bilateral lumbar pain, pyuria, dysuria and increased urinary frequency. The diagnosis of bilateral renal calculi was made. He was unwisely placed on a diet consisting of milk, cream, cheese and vegetables, a high calcium diet, which might tend to increase the formation of calculi.

Examination. There was moderate right costovertebral tenderness and slight enlargement of the prostate gland. The urine was alkaline, contained moderate amounts of albumin, many clumped pus cells, and culture showed B. Proteus. The blood urea nitrogen was elevated to 45 mg. per 100 c.c. The blood sugar was 115 mg., blood calcium 10.6 mg., and blood phosphorus 5.7 mg. per 100 c.c. The phenolsulphonphthalein excretion was 40 per cent in six hours. A flat abdominal plate revealed huge bilateral staghorn renal calculi. On cystoscopy the right ureter could be catheterized to the pelvis and the indigo-carmine was obtained twenty minutes after intravenous injection. On the left side, however, the catheter was obstructed at 22 cm. and no indigo-carmine was visualized. These findings were attributed to a temporary block of the kidney, presumably by a renal calculus. In view of the extensive bilateral renal damage, it was deemed inadvisable, however, to attempt to relieve this obstruction, and the patient was therefore referred to the Out-Patient Department for further observation.

Second Admission. The patient was readmitted on December 18, 1935. Following discharge from the hospital, he had nocturia (twice), increased diurnal frequency (every hour), terminal and slight loin pain, dysuria, urgency and pyuria and had lost 45 pounds in weight, 28 of which were lost during the preceding two weeks. On December 13, 1935 (11 months after discharge) he was suddenly seized with severe cramplike abdominal and lumbar pain. Increased urinary frequency, strangury, pyuria, hematuria and vomiting accompanied the attack. The pain radiated to the tip of the penis, scrotum and down the posterior aspects of the thigh. There was no history of chills or fever, however.

Examination. Slight right costovertebral tenderness and enlargement of the prostate gland were again found. The urine (casual specimens) showed a low specific gravity (from 1.010–1.012), abundance of albumin, red blood cells and clumped pus cells. The blood urea nitrogen was now increased to 145 mg. per 100 c.c.; the blood pressure was 124 systolic and 84 diastolic.

Course. The bilateral costovertebral tenderness became exaggerated, and the

patient developed an intermittent temperature, which occasionally rose to 102.4°F. The blood CO_2, two days before exitus, was decreased to 13 volumes per cent, and respiration became deep and labored. Sodium bicarbonate administered by mouth, glucose and saline intravenously were of no avail. The patient lapsed into coma and died nine days after his second admission, four years following the onset of his complaints. His death was ascribed to renal insufficiency caused by calculous pyonephrosis.

Post Mortem Findings. The *kidneys* were markedly enlarged and weighed 900 gm. together (normal about 300 gm.). The right kidney was about three times the size of the left. The renal capsules were thickened and bulged irregularly due to fluctuant cortical yellow nodules which were filled with thick purulent fluid. In addition, the renal surfaces, especially that of the right kidney, were studded with pea-sized yellow abscesses. These on section were seen to extend deeply into the cortex and frequently into the medullary portions of the kidneys. The renal pelves and calyces were markedly dilated and filled with yellow, friable, dendritic, staghorn calculi. There was an associated compression of the adjacent parenchyma. Moderate enlargement of the prostate gland with median bar formation, dilatation of the urinary bladder and ureters were also found.

The parathyroid glands showed no changes. Dr. Klemperer commented, however, on the frequency with which parathyroid enlargement was associated with nephrolithiasis and recalled an instance he observed in which the parathyroid glands weighed 400 mg.

Comment. Dr. Baehr stressed the importance of diet in urolithiasis. He felt that a milk diet, because of its high calcium content, was contra-indicated in this case. The excessive ingestion of vegetables was also interdicted because it tends to alkalize the urine and precipitate the relatively insoluble calcium salts. In evaluating the possibility whether the formation of bilateral renal calculi might have been an expression of hyperparathyroidism, too much emphasis ought not be placed upon the patient's normal blood calcium level. The observations on the blood calcium were made in this case only when the patient was in the terminal stage of renal insufficiency. If the chemical determination had been made earlier, the calcium level might have been found to be much higher. In renal insufficiency, an increase of blood phosphorus occurs due to retention. There is, therefore, decreased mobilization of calcium phosphate from bone and consequently a marked diminution in the blood calcium. The normal blood calcium figures in this case of advanced renal insufficiency are therefore abnormal, especially in view of the presence of a high blood phosphorus. Hyperparathyroidism must therefore still be considered as a possible cause of the extensive deposition of renal calculi. Reference was made to the cases reported by F. Albright (Am. J. M. Sc., 187: 49, 1934) and Albright, F.; Aub. J. C.; and Bauer, W. (J. A. M. A., 102: 1276, 1934) where the blood calcium was found elevated, and the patient was believed to have hyperparathyroidism. In some of these instances operation revealed adenoma or hyperplasia of the parathyroid glands.

Case 2. Malignant Grawitz's tumor and amyloidosis (From the Medical Service of Dr. George Baehr)

History (Adm. 386898). The patient, a white female, 50 years old, entered the hospital November 18, 1935, complaining of edema of the legs of two months

duration. Six months prior to her admission she became pallid and began to complain of increasing weakness and dyspnoea. The edema subsided considerably after a prolonged period of bed rest.

Examination. The patient was a poorly nourished, pallid female with anasarca. The fundal arteries were slightly narrowed. A firm, irregular, ballotable mass, about the size of a small grapefruit, was palpable in the left lower abdominal quadrant. The blood hemoglobin was 52 per cent and red blood cells 3,800,000 per cu.mm. Urinalysis showed a variability of specific gravity from 1.008 to 1.020, a moderate amount of albumin, few granular and hyaline casts and occasional red cells. The blood urea nitrogen varied from 9 to 18 mg. per 100 c.c. The total serum protein was 4.5 per cent (albumin, 2.0 per cent; globulin, 2.5 per cent) and the phenolsulphonphthalein excretion was 25 per cent in two hours. The blood pressure was 140 systolic and 80 diastolic. The clinical impressions were renal neoplasm (maligant Grawitz's tumor) with metastases or possibly cystadenocarcinoma of the ovary with associated ascites and edema due to peritoneal implantations.

Course. An intravenous urography failed to visualize the pelves or calcyces of either kidney, ureters or urinary bladder. On cystoscopy each ureter was catheterized to its proximal end and a normal flow of urine was obtained from each side. Intravenous indigo-carmine appeared in good concentration from the right kidney in four minutes, and in only fair concentration from the left in six minutes. Retrograde pyelograms revealed a moderate degree of deformity of the calyces of each kidney and suggested the possibility of polycystic renal disease. In spite of repeated transfusions, high protein diet, exhibition of iron and liver extract, the level of hemoglobin was but little affected, and the edema gradually increased. The patient grew steadily weaker, became stuporous and died seven weeks following her admission to the hospital.

Post Mortem Findings. The kidneys were moderately enlarged, yellowish-white and increased in consistency. The cortex on section was widened and glassy. Occupying the middle third and anteromedial portion of the lower pole of the left kidney was an orange-colored, irregularly lobulated, soft mass which measured 17 by 9 by 5 cm. Section through the mass revealed a central fibrous core about which the mottled grey and yellow, fleshy and cystic lobules were disposed. The left renal vein was invaded by the neoplasm and its lumen completely occluded by tumor tissue. The splenic flexure of the colon was densely adherent to the mass but not perforated. The right kidney presented a small metastatic nodule. The lumina of the larger tributaries and main stem of the right renal vein were partially occluded by soft thrombi. There were large metastatic nodules in the suprarenal glands, lungs, and smaller secondary tumor foci within the liver.

The spleen was moderately enlarged, firm, and rubbery. Its cut surface was smooth and the Malpighian follicles waxy. A terminal thromboendocarditis of the aortic valve was also found.

Comment. Dr. Klemperer stated that microscopic examination of the tumor revealed numerous glassy, large, vegetable-like cells mingled with other atypical cells—a clear-cell adenocarcinoma (malignant Grawitz's tumor). There was also a coincident generalized visceral amyloidosis (kidney, spleen, liver, lymph node and ovary). An unusual feature was the very extensive metastasis to the suprarenal glands.

Dr. Baehr felt that too much significance had been laid by the X-ray department

upon the deformity of the kidney pelves found on roentgenological investigation. The clinical picture was not that usually associated with polycystic kidneys, but was more suggestive of a renal neoplasm. The patient's blood pressure was not elevated as in polycystic renal disease, while the albuminuria was much more marked than is usually observed in polycystic kidneys. Only one instance of polycystic kidney was recalled in which there was a marked albuminuria, and here there was also found a renal neoplasm. The presence of a normal blood urea nitrogen and good variability of specific gravity also militated against the diagnosis of polycystic kidney disease in a terminal stage. Dr. Baehr remarked that the possibility of visceral amyloidosis was entertained clinically, but that renal vein obstruction subsequent to a malignant Grawitz's tumor was considered the more likely factor in the production of the edema. Venous stasis was visualized during life as the cause of the intense albuminuria and hypoproteinemia. In retrospect, however, it was felt that the amyloidosis found at necropsy was the more important factor in the causation of the anasarca than the renal vein thrombosis.

Reported by Henry Horn, M.D.

Wednesday, January 22, 1936

Case 1. Agranulocytosis due to arsenobenzol (From the Medical Service of Dr. B. S. Oppenheimer)

History (Adm. 388464). The patient was a 44 year old Spanish cook, who six weeks before admission developed a chancre and was found to have a positive blood Wassermann test. Treatment was begun immediately. He received .3 gm. of neoarsphenamine intravenously, followed in seven days by .6 gm. The latter dose was administered five times thereafter, at intervals of five days. At the same time he was given weekly intramuscular injections of a bismuth arsenic preparation (bismarsen).

Ten days before admission, one week after his last injection, the patient developed a stomatitis which increased gradually in severity. Four days before entering the hospital, he began to have temperature elevations to 104°F. This was associated with marked weakness.

Examination. The patient was acutely ill. His temperature was 105°F. His complexion was pale and pasty. There was a slight icteric tint to the sclerae. He had difficulty in opening his mouth beyond a half inch. The gums were markedly swollen, soggy, pink in color, and covered by a translucent, adherent, grayish-white pseudo-membrane which bled easily when touched. There were bleeding areas on the tongue. The tonsils were edematous and almost met in the midline. The right tonsil was covered by a grayish exudate, and the pharynx was considerably reddened. Soft, discrete, bean to walnut-sized nodes were palpable in the cervical, axillary and inguinal regions. Over the left base there were dulness, diminished breath sounds, and numerous fine crepitant râles. The heart was slightly enlarged to the left; its sounds were of poor quality, and a gallop rhythm was present. A systolic murmur was audible over the apex. The liver was enlarged to the level of the umbilicus and was somewhat tender.

The blood count disclosed the following: hemoglobin, 82 per cent; red blood cells, 4,310,000 per cu. mm.; platelets, 210,000 per cu. mm.; 450 white blood cells per cu. mm. with 80 per cent lymphocytes and 20 per cent reticuloendothelial cells (monocytes). No granulocytes were found. The icteric index was 14; the direct

Van den Bergh was negative; the indirect Van den Bergh was positive 1:100,000, indicating the presence of 1 mg. of bilirubin per 100 c.c.

The diagnosis of agranulocytosis following arsphenamine therapy for lues was made.

Course. The patient's condition was critical from the time of admission. During the next two days, the temperature ranged between 102.6° and 105.4°F. Despite three transfusions at 400 c.c. each and daily intramuscular injections of liver extract, the white blood cells did not increase in number and only one polymorphonuclear leucocyte could be found in a blood smear after a transfusion. On the second day pneumonic consolidation developed in the left lower lobe, and the patient died.

Post Mortem Findings. In addition to the patchy, ulcerative stomatitis there was a severe necrotizing inflammation of the esophagus. The mucous membrane of the latter was edematous, dirty gray in color and showed raised, grayish-yellow, granular bands. It was noted that the wall of the esophagus became increasingly thicker from the junction of the middle and upper third of the esophagus to the point of entrance into the stomach. At this site the esophageal wall was approximately six times the usual thickness and was diffusely indurated. The stomach showed only multiple acute erosions. Other pertinent gross findings were: patchy and confluent bronchopneumonia of both lower lobes, hemorrhagic pulmonary edema, acute bilateral fibrinous pleuritis, a partially healed chancre of the body of the penis, and acute lymphadenitis of the inguinal, iliac, periarotic, and tracheobronchial lymph nodes.

Microscopic examination of the bone marrow showed the cells of the erythropoetic series to be undisturbed. The most prominent finding was the complete absence of granulopoesis. Large cells resembling hemocytoblasts, apparently atypical myeloblasts, could be found. In the lung, areas of necrosis surrounding bacterial emboli were noted. The usual abscess formation around such foci was absent due to the lack of leucocytic reaction.

Comment. Dr. Baehr emphasized the hematotoxic properties of arsenobenzol, both arsenic and benzol possessing the ability to damage bone marrow. He pointed out the similarity in effect on the bone marrow of dinitrophenol and pyramidon. Although in this instance the injury produced by the arsenobenzol was specific for the granulocytes, the toxic substance usually affects any or all of the blood elements, resulting in the clinical picture of aplastic anemia or symptomatic thrombopenic purpura.

In cases with a general depression of any or all blood elements, it is important to keep the patient alive by repeated transfusion, for not infrequently the bone marrow is thereby given time for regeneration, and clinical recovery results. During the stage of recovery from aplastic anemia due to arsenobenzol, one element of the blood may return to normal before the others. Usually either the leucocytes or the platelets lag, the red cells and hemoglobin being the first to rise. In some instances, however, the reverse relationship may be observed in cases of poisoning due to this drug.

Case 2. Rheumatic cardiovalvular disease with thrombo-endocarditis (From the Medical Service of Dr. B. S. Oppenheimer)

History (Adm. 388335). The patient was a woman, 49 years of age. As far back as she could remember, blueness of her lips and skin had been present. About

two months before entering the hospital, she began to experience moderately severe, sticking, non-radiating, epigastric pain, which occurred a short time after meals and was sometimes relieved by vomiting. This had led to progressive weakness. For the past two months, there had also been increasing dyspnea on exertion, palpitation and occasional ankle edema. Two days before admission, the patient noted that the ankle edema was much more marked than previously. She consulted a physician who informed her for the first time that she had heart trouble.

Examination. The patient had cyanosed lips, rather florid complexion, mottled purplish skin, and red hands. She was dyspneic. No significant physical signs were noted in the lungs at this time. The heart was enlarged; its left border percussed 2 cm. beyond the nipple line in the fifth space, and the right border was made out at 2 cm. beyond the right sternal border. The pulmonary conus was enlarged. The heart sounds were regular; a palpable thrill was present over the midsternum after full expiration in the sitting position. Over the midsternum at the level of the fourth rib there was a harsh, to-and-fro murmur occupying entire systole and part of diastole. This murmur radiated to apex and base. The liver was palpable one finger below the costal margin. It was not tender. The spleen was enlarged to 2 to 3 fingers below the left costal margin and was of firm consistence. The extremities were moderately cyanotic. No clubbing was present.

The arterial pressure was 122 systolic and 92 diastolic and the venous pressure was 16.5 cm. X-ray examination of the chest showed a generalized enlargement of the heart, particularly to the right. There was straightening of the left cardiac border. The pulmonary conus was prominent. The lungs were considerably congested. An electrocardiographic tracing disclosed a sinus tachycardia of 100 per minute, tendency to right axis deviation, wide p waves and moderately low QRS complexes, suggesting hypertrophy of the right ventricle and auricle with associated poor functional condition of the myocardium.

The original clinical impression was that the patient had congenital heart disease, possibly the tetralogy of Fallot. However, it was suggested by Dr. Oppenheimer that this was a case of rheumatic disease with mitral stenosis.

Course. The patient had episodes of paroxysmal dyspnea relieved only by morphine. She developed areas of consolidation in both lungs and despite the administration of digitalis, mercupurin and oxygen, the manifestations of congestive failure gradually increased. On the fourteenth day after admission, while being cared for by a nurse, she suddenly began to gasp for breath, became very cyanotic and went into collapse. Phlebotomy and supportive therapy were ineffectual and the patient died. It was believed that death was due to pulmonary embolization.

Post Mortem Findings. The *heart:* the right auricle, right ventricle and left auricle were markedly enlarged, while the left ventricle appeared to be of normal size. The right ventricular myocardium was markedly hypertrophied. The tricuspid orifice was dilated, and the leaflets of this valve somewhat thickened. Along the line of closure were noted numerous translucent excrescences which were less than a pin-head in size. The chordae tendinae inserting into the anterior cusp were thickened, shortened and fused. The pulmonic conus was moderately dilated. On the anterior and left posterior cusps of the pulmonic valve were found several small, pin-head sized vegetations. The endocardium over the posterior wall of the left auricle was wrinkled and showed small, slightly raised, grayish-pink areas.

The mitral osteum was rigid, barely admitting the tip of the little finger. The leaflets were rigid and their free edges curled upward to form a shelf-like structure. The line of closure was deformed and its irregular edge studded with numerous gray, glistening, pin-head sized verrucae. In addition there was a rather firmly adherent, small, fleshy, pink body attached to each leaflet at the closure line. The chordae tendinae were thickened, shortened and slightly nodular, inserting underneath the "shelf". The left and right anterior cusps of the aortic valve were firmly adherent to each other for about three millimeters, obliterating the normal commissure. The coronary arteries were entirely normal. The morphological picture, then, was that of rheumatic cardiovalvular disease with stenosis and insufficiency of the mitral and tricuspid valves. There was a superimposed acute verrucous endocarditis of the tricuspid, pulmonic and aortic valves. The lesion in the left auricle was an old MacCallum lesion. There was also found, as described, a thrombo-endocarditis of the mitral valve, crushings of these lesions disclosing no organisms. Additional gross findings were chronic passive congestion of the lungs, liver and spleen, pericardial effusion, ascites, bilateral hydrothorax, pulmonary arteriosclerosis, multiple pulmonary infarcts, and organized infarcts of the kidney and spleen.

Comment. In this case, there was no history of the arthritic or other clinical manifestations of acute rheumatic fever. The history of cyanosis since childhood indicates that a cardiovalvular lesion due to such an infection probably occurred early in life. After more than forty years this patient developed an acute exacerbation of the rheumatic heart infection which precipitated circulatory failure and death.

Reported by Frederick H. King, M.D.

Wednesday, February 26, 1936

Case 1. Coeliac disease in an adult—with superimposed primary anemia, multiple vitamin deficiencies and scurvy (From the Medical Service of Dr. George Baehr)

History (Adm. 386304). The patient, a 41 year old white female, was first admitted to the hospital on July 11, 1935 because of dyspnea on exertion and weakness of three years' duration. At the time of onset there were amenorrhea for intervals of three to four months and occasional hemoptyses. During the five weeks preceding her admission she began to suffer with facial and ankle edema, anorexia and postprandial emesis. A distinct yellowish-brown discoloration of the skin was noted during the last six weeks, and one week before admission sharp cramp-like pains recurred in the posterior tibial regions.

There was no history of disturbance of gait, numbness, paresthesias or urinary difficulties. There was a history of rather persistent recurrence of diarrhea since the age of four.

Examination. The patient was an undernourished, dwarfed, extremely pallid female. There were a few purpuric areas in the skin over the lower extremities and in the right conjunctiva. The fundi were pale and showed scattered hemorrhages. The tongue was smooth and somewhat atrophic. There was evidence of moderate cardiac enlargement. Heart sounds were of fair quality with a loud precordial systolic blowing murmur. The liver edge was palpable three fingers' breadth

below the right costal margin. The long bones were tender. The neurological status was negative. The blood hemoglobin was 14 per cent (Sahli); red blood cells numbered 820,000 per cu. mm. and exhibited anisocytosis and poikilocytosis; white blood cells, 1,950 per cu. mm.; polymorphonuclear leucocytes, 55 per cent; lymphocytes, 41 per cent; mononuclears, 3 per cent; myelocytes, 1 per cent; reticulocytes, 2.6 per cent; normoblasts, 1 per 100 white blood cells; blood platelets averaged 70,000 per cu. mm. The blood urea was 14 mg., blood sugar 100 mg., and blood cholesterol 357 mg. per 100 c.c. Icterix index, 8; Van den Bergh: direct, negative; indirect 1:300,000. Total proteins, 6.0 per cent (albumin 3.8, globulin 2.2). The blood Wassermann was negative. The blood calcium was 7.6 mg. and blood phosphorus 2.4 mg. per 100 c.c. Janney tests for sugar tolerance performed on three occasions showed fairly low flat curves. A Rehfuss test-meal on two occasions revealed the presence of free acid up to 64 and total acid up to 60. Roentgenological examination of the long bones showed evidence of an old rickets (bowing). The stools were persistently guaiac negative, and examination of a 72 hour specimen showed a total fat content of 12.5 per cent (normal 15 to 20 per cent). There was an occasional slight albuminuria. The blood picture of pernicious anemia, the presence of free hydrochloric acid in the gastric contents, and the history of persistent diarrhea since the age of 4 associated with dwarfism suggested two possibilities: coeliac disease with superimposed avitaminosis or non-tropical sprue.

The patient received liver extract intramuscularly, repeated blood transfusions and large doses of iron. Following these measures the reticulocytes rose to 21 per cent, the hemoglobin to 55 per cent and the red blood cells to 3,600,000 per cu. mm. This improvement in the blood picture and especially the reticulocytosis seemed to support the diagnosis of non-tropical sprue. The patient was discharged to a convalescent home five weeks after admission (August 20, 1935).

Second Admission. The patient was readmitted to the hospital on September 30, 1935. While at the convalescent home she continued to receive bi-weekly intramuscular liver injections. Anorexia, vomiting and diarrhea recurred and there was a loss of weight of 14 pounds during this period. Physical examination of this pale, emaciated dwarf was essentially the same as on her previous admission. The cardiac murmur, however, was now whirring in quality, heard all over the precordium but with maximal intensity at the apex. The edge of the liver was just palpable at the costal margin. The exposed cutaneous areas showed a brown pigmentation. The blood hemoglobin was 47 per cent; red blood cells, 2,980,000; reticulocytes 0, and white blood cells, 7000 per cu. mm.; polymorphonuclear leucocytes, 67 per cent; lymphocytes, 29 per cent; monocytes, 4 per cent. The bleeding time was one minute, clotting time 12 minutes and clot retraction time was one-half hour. The number of blood platelets averaged 160.000 per cu. mm. The blood nitrogen was 14 mg., total cholesterol 140 mg., and cholesterol ester 55 mg. per 100 c.c. Blood calcium 7.4 mg. and blood chlorides 595 mg. per 100 c.c. Roentgenological investigation of the gastro-intestinal tract showed no evidence of any organic lesion. The blood pressure was 92 systolic and 60 diastolic.

For a period of two weeks the patient was uncooperative and occasionally irrational. She also had epistaxis, oozing from the nasopharynx, diarrhea and bouts of vomiting. The diarrhea and emesis were soon controlled by cocaine hydrochloride and deodorized tincture of opium, but in spite of the continued use of liver

extract there was no hematological response, and the patient continued to lose ground. She was then transfused twice on succeeding days. On intramuscular liver injections and iron the blood picture continued to improve rapidly. Her mental state cleared and she became agreeable and cooperative; with this there was a distinct general improvement. At the time of her discharge the blood hemoglobin was 73 per cent and the red blood cells 2,980,000 per cu. mm. It was now felt that she was suffering from a secondary anemia attributable to a nutritional defect, superimposed upon a basic coeliac disease which had existed since childhood. She was referred to the Hematology Clinic on October 27, 1935.

Third Admission. On the second night following her discharge from the hospital, the patient began to vomit bright clotted red blood. She also had repeated epistaxis and persistent gingival bleeding. Several days later, diarrhea recurred and a painful swelling appeared in the left thigh and right upper extremity. She was readmitted on November 3, 1935, one week following her last discharge. The significant physical findings included bilateral carpopedal spasm, positive Chvostek and Trousseau signs, erosions of both sides of the nasal septum, smooth and atrophic tongue, abdominal distension and a large hematoma which extended from the left buttock down the left thigh and leg. The blood hemoglobin was 46 per cent and there were 2,080,000 red blood cells per cu. mm.; 8,900 white blood cells per cu. mm.; (55 per cent polymorphonuclear leucocytes, 45 per cent lymphocytes). The blood platelets numbered 180,000. Bleeding time was 5½ minutes, clotting time 29 minutes, clot retraction occurred after 45 minutes. Blood calcium was 6.3 mg. and phosphorus 1.7 mg. per 100 c.c.

Course. The patient was given intravenous calcium gluconate, repeated blood transfusions, reduced iron, vitamins A, B, D, G, -all to no avail. It was then suggested by Dr. Baehr that the bleeding tendency was due to scurvy and that injection of cevitamic acid was indicated. Unfortunately only one dose could be administered. The bleeding from nose, gums and into the subcutaneous tissues persisted. The temperature which fluctuated irregularly between 101.2° and 98.6°F. suddenly rose to 104.4°F. before she died, twelve days after her third admission.

Necropsy Findings. The gingivae were spongy, bloody and swollen, the tongue pale, smooth and fissured. Ecchymoses were noted in the skin over the entire right arm, legs and torso and a hard irregular mass was palpable over the posterior aspect of the left thigh (hematoma). The viscera were small. The cortical surfaces of the kidneys were irregularly granular and contained many depressed red stellate scars. There were several hemorrhagic zones in the renal pelvic mucosa. The gastro-intestinal tract revealed a few small subserosal hemorrhages and similar hemorrhagic zones were noted in the pleura, mucous membranes, and anterior mediastinum.

Comment. Dr. Klemperer expressed the opinion that no remarkable gross diagnostic features were found at necropsy. There were neither atrophy nor ulcerations of the gastro-intestinal tract, and microscopically the gastric glands were normal both in structure and in distribution. However, histologic preparations revealed a deposition of brown, non-iron containing pigment granules within the muscular coat of the intestine and more particularly in the duodenum and jejunum. The pigment, hemofuscin, he pointed out, could occasionally produce a brown discoloration and was generally found in hemochromatosis. He also called atten-

tion to the fact that such an intestinal pigment deposition occurred in chronic alcoholism and chronic morphinism and expressed the opinion that its formation might possibly be associated with a vitamin deficiency. He recalled an instance of sprue mentioned in the literature in which such intestinal pigmentation was encountered. The contractions of the kidneys, he felt, were the result of healing of a true interstitial nephritis produced by the circulation of toxins during the patient's long drawn-out illness. The bone marrow was cellular but not very hyperplastic. In sprue, he remarked, the bone marrow is megaloblastic, though this is less conspicuous than in pernicious anemia. In cases that have been treated with liver, the megaloblastic bone marrow changes to a normoblastic one. In the instance under discussion both megaloblasts and normoblasts were present.

Dr. Baehr alluded to the similarities between sprue and pernicious anemia; both diseases are due to a deficiency of absorption of a substance necessary for hematopoiesis; the gastro-intestinal disturbances and blood picture are frequently of a similar type; the abnormalities of the mucous membranes and tongue, although not as regularly observed as in pernicious anemia, are often an accompaniment of sprue; the secretion of gastric hydrochloric acid is commonly observed throughout the course of sprue but is absent in pernicious anemia.

Dr. Baehr made the suggestion that the clinical picture presented by this patient was the result of a profound nutritional disturbance superimposed on a long-standing coeliac disease. The improvement on liver therapy favored the diagnosis of sprue,—but what is sprue but a heterogenous term employed for patients with an obscure gastro-intestinal disorder in which there is a deficiency in absorption of a number of substances such as calcium and the essential hematopoietic principle. There are probably many other deficiencies in the absorption of vitamins in these cases. This patient had a gastro-intestinal disorder since the age of 4, which resembled coeliac disease. The later development of the hemorrhagic tendency, however, seemed to indicate that a nutritional deficiency, more specifically scurvy, was perhaps a more likely possibility. Vitamin therapy at this stage did not retard the patient's downhill course, since adequate treatment with vitamin C was not accomplished. The arrested physical development (dwarfism) characteristic of coeliac disease is probably associated with vitamin G deficiency. The pigmentation of the exposed skin surfaces noted in this patient is observed in pellagra, chronic alcoholism, and other conditions in which there are vitamin B and G deficiencies. The bleeding tendency, restricted and slight as revealed by the presence of petechiae on the first admission, became more marked and severe before the patient's last admission, indicating a definite vitamin C deficiency. In view of the normal platelet counts, the normal bleeding and only slightly prolonged coagulation time, a blood disease could be ruled out and the bleeding from the nose, gums, stomach, the tenderness of the bones and the huge hematoma of the thigh was felt to be due only to scurvy.

The tetany was due to hypocalcaemia due to prolonged deficiency in absorption of calcium from the gastro-intestinal tract. Adequate amounts of calcium gluconate were administered intravenously, and the tetany was promptly relieved. Adequate amounts of vitamins A, B, D and G were given. It was Dr. Baehr's opinion that the patient should have been treated more intensively with cevitamic acid and that the cause of death was scurvy.

Case 2. Rheumatic fever in old age—a case of rheumatic cardiovalvular disease with extensive embolization (From the Medical Service of Dr. B. S. Oppenheimer)

History (Adm. 389016). A white female, aged 62 years, entered the hospital on January 19, 1936, complaining of dyspnea, orthopnea and a non-productive cough of three months duration. There had also been exertional, non-radiating precordial pain and infrequent left shoulder pain and numbness of the left upper extremity at rest. Ankle edema was noted at night during this period.

In 1928 at the age of 54, the patient experienced a first attack of severely painful polyarthritis with temperature occasionally rising to 103.0°F. She was hospitalized for a period of three months. During the following three years (1928 to 1931), dull joint pains frequently recurred. Two months ago she was told that she had hypertension. The night before admission she developed a left lower facial paralysis and transient motor aphasia.

Examination. The patient appeared chronically ill, markedly dyspneic and orthopneic, with flattening of the left side of the face. The retinal arteries were moderately tortuous and distinctly compressed the veins. There were numerous sibilant and sonorous râles heard throughout both lungs with moist râles at the bases. Dulness and diminished breath sounds were present in the right axilla. The heart was markedly enlarged to the left. The heart sounds were of fair quality with numerous extrasystoles, A_2 louder than P_2. A soft systolic blow was heard at the apex. The liver edge was palpable two fingers' breadth below the costal margin, and slight edema was found in the pretibial and sacral regions. There was a left lower facial weakness and diminished bilateral corneal, gag and abdominal reflexes. The blood pressure was 180 systolic and 82 diastolic. The blood hemoglobin was 98 per cent; white blood cells, 13,500 per cu. mm. (polymorphonuclear leucocytes, 88 per cent). The venous pressure was 7.5 cm. with a rise to 9.5 cm. upon right upper quadrant pressure. The electrocardiogram taken soon after admission showed a regular sinus rhythm and left ventricular preponderance. The blood Wassermann test was negative. The diagnoses considered were arteriosclerotic heart disease with cardiac failure and possibly cerebral embolism.

Course. Following administration of digitalis, mercupurin and bed rest, signs of congestive failure became less pronounced and a long soft diastolic murmur became audible at the apex. On the third day after admission auricular fibrillation appeared and soon thereafter the patient was seized with pain in the left upper quadrant and over the left chest. This was attributed to splenic embolization and infarction. The left upper quadrant pain became more intense and shock tenderness was elicited both in this area and in the costovertebral region. The spleen edge became palpable two fingers' breadth below the costal margin and was quite tender. The antecedent history of rheumatic fever, the apical murmurs, cerebral manifestations, left upper quadrant pain, and microscopic hematuria were all in favor of a diagnosis of chronic rheumatic cardiovalvular disease with mitral stenosis and insufficiency and multiple foci of embolization. The patient's heart continued to fibrillate and there was a pulse deficit which varied from 4 to 30 per minute.

Eleven days following admission she suddenly suffered severe upper abdominal pain which was accompanied by epigastric and periumbilical tenderness. A white blood count showed 23,200 cells per cu. mm. with 89 per cent polymorphonuclear

leucocytes. Embolization of the superior mesenteric artery was suspected. Three days after this episode there was sudden onset of pain in the right leg followed by coldness and cyanosis of the leg. The dorsalis pedis artery could not be palpated and oscillometric determinations showed absence of oscillations at the right ankle. The abdominal pain and tenderness persisted and to these were added slight rigidity and emesis. Twenty-six days after admission signs of embolization of the left radial artery appeared. On the following day the patient began to vomit dark brown feculent material; her respirations became very labored and she died within a few minutes after onset of vomiting. The temperature throughout the patient's illness fluctuated irregularly between 99.0° and 101.6°F. with a tendency toward normalcy during the last week. It was thought that gangrene of a loop of intestine due to mesenteric embolism had resulted in general peritonitis.

Necropsy Findings. The heart was enlarged and presented evidence of chronic rheumatic interstitial valvulitis of the mitral, tricuspid and aortic valves. There was stenosis and insufficiency of all orifices but more especially of the mitral. Multiple mural thrombi were found in the left auricular appendage and endocardium of the left ventricle. Organizing emboli occluded a large branch of the superior mesenteric, the splenic, right common iliac and smaller branches of the renal arteries. Subsequent to these embolic arterial occlusions, there were found extensive splenic infarction, hemorrhagic infarction of approximately two feet of ileum, early acute serofibrinous peritonitis, and multiple renal infarcts. There was also a retrograde thrombosis of the tributaries and main stems of the superior mesenteric, splenic, portal, gastric coronary and gastro-epiploic veins.

Comment. This case, as was pointed out by Dr. Baehr, illustrates that even elderly people are not immune to acute rheumatic fever and that the disease is responsible for some of the cardiac disabilities in this older age group.

Reported by Henry Horn, M.D.

Maurice Frankfort

May 14, 1859–August 16, 1936

Many a successful American business man looks wistfully upon the non-commercial careers of publicists and scientists, but as a rule the longing remains a mere velleity, resulting in no decisive action. The case of Maurice Frankfort was exceptional; in him the desire to engage unselfishly in welfare work became a dominant urge. At the height of his success he turned his business over to his assistants and became a member of the Board of Trustees of The Mount Sinai Hospital. At once the Hospital became his major interest; and for years, until failing health compelled him to rest, the progress of the hospital, its scientific work, its professional ideals, its administrative efficiency, its social relations, and its welfare work occupied most of his mind, of which, however, a part was always reserved for the loyalties of many fine and enduring friendships.

The Board of Trustees of the Hospital and the Hospital's Medical Board have elsewhere recorded their appreciation of Maurice Frankfort's services, but it is fitting that there be added to the record, on behalf of the rank and file, a tribute to a friend who was always accessible when counsel was needed, and whose sympathy, understanding, encouragement and support were unfailing sources of inspiration and solace.

ABSTRACTS

Authors' Abstracts of Papers Published Elsewhere by Members of the Mount Sinai Hospital Staff

Members of the hospital staff and the out-patient department of The Mount Sinai Hospital are invited to submit for publication in this column brief abstracts of their articles appearing in other journals.

Capillary Development and its Relation to the Intelligence of Children with Mongolism. S. D. Leader and M. Grozin. Am. J. Dis. Child. 49: 1169, May 1935.

Microscopic studies of the capillaries in vivo and psychologic tests were made on twenty-two children with mongolism. All the children had capillaries that were abnormal in some phase of their development. In the main, in the children whose intelligence appeared to be higher than that of the average person with mongolism, the capillaries more nearly approached normal. In those with extreme mental deficiency, the capillaries appeared to be in the more primitive stages of development. This, however, was not definite in all cases. It is apparent that one can not use the degree of development of the capillaries as an index of mental development in mongolism in spite of the fact that there appears to be a correlation between them.

Fabella (Sesamoid in the Lateral Head of the Gastrocnemius). C. J. Sutro, M. M. Pomeranz and S. M. Simon. Arch. Surg. 30: 777, May 1935.

A roentgenographic study of the knee joints of 700 patients revealed the presence of at least a single fabella in 11.5 per cent. Usually the fabella, when present, is bilateral. It is usually similunar in the lateral view and elliptical or circular in the antero-posterior view. This sesamoid undergoes pathologic alterations such as arthritis, fracture and gout. The fabella may be a bony landmark for the roentgenographic recognition of effusions near the knee joint.

History of Jewish Physicians in the United States up to about 1900. S. M. Simon, Ann. M. Hist. 7: 285, May 1935.

This is a brief review of the lives and salient works of these Jewish physicians. Two Jewish physicians sailed with Columbus. The earliest in the United States settled in Maryland in 1656. The "Fighting Doctor" of the Civil War, who was the first surgeon general of the Confederacy, the life of Simon Baruch, pioneer in hydrotherapy, and the comparatively large number of specialists in the field of eye, ear, nose and throat are considered.

Mental Symptoms in Cases of Tumor of the Frontal Lobe. Israel Strauss and Moses Keschner. Arch. Neurol. & Psychiat. 33: 986, May 1935.

In a study of 85 patients with brain tumors involving the frontal lobe, the authors found mental symptoms in 90 per cent of the cases. Mental changes were the earliest manifestations of tumor in 37 patients.

The outstanding symptoms in order of their frequency were disturbances in the

sensorium (80 per cent), alterations of personality (70+ per cent), changes in affect (70 per cent), impairment of intellect and higher psychic functions (70 per cent), and defects in memory and orientation (70 per cent). By themselves, mental symptoms are of little aid in the differential diagnosis of frontal lobe tumor. Psychiatric syndromes indistinguishable from those found in patients with frontal lobe tumors may occur also in the aged and arteriosclerotic and in people with other organic diseases of the brain, regardless of their location.

It was noted that euphoria and facetiousness did not occur with sufficient frequency to justify their consideration as pathognomonic of tumors of the frontal lobe. They were considered to be more likely exaggerated expressions of the patient's previous emotional state. The difference in the nature and frequency of occurrence of mental changes caused by tumors of the right hemisphere and of the left was negligible. Mental symptoms were present in all patients in whom the neoplasm involved both frontal lobes. The actual part of the frontal lobe implicated by the tumor, whether cortical, subcortical, premotor, prefrontal or subfrontal, was found to make no appreciable difference in the nature or frequency of occurrence of mental reactions. In cases of rapidly growing, infiltrating neoplasms and of diffuse tumors, mental deterioration and alteration of personality appeared much earlier than in cases of slowly growing tumors; in the latter, changes in personality were for a long time the only mental symptom.

Intracranial hypertension is considered an important determining factor in the production of disturbances in the sensorium and in spontaneity of thought and speech. The following are determining factors in the frequency of occurrence, nature, and severity of mental symptoms: (1) extent of involvement (direct or indirect) of the brain tissue; (2) rapidity of growth of the tumor; (3) intracranial hypertension; (4) the patient's previous mental make-up; and, possibly, (5) the convulsive state.

Mixed Tumor of the Orbit of the Salivary Gland Type. M. A. Last. Arch. Ophth. 13: 812, May 1935.

A tumor removed from the orbit of a man of 32 resembled in structure that described as a salivary gland mixed tumor. The clinical findings were exophthalmos, refractive changes, and wrinkling of the retina. These disappeared with the removal of the tumor.

Painless Jaundice. R. Ottenberg. J. A. M. A. 104: 1681, May 1935.

The article summarizes the experience of the first year of the "Liver Group" at The Mount Sinai Hospital, with regard to the diagnosis and treatment of painless jaundice. An attempt is made to evaluate the different diagnostic procedures. It is pointed out that there is as yet no sure way of distinguishing obstruction of the bile duct from suppression of bile due to liver cell injury. Determining whether the Van den Bergh reaction is direct or indirect does not help for this diagnosis. For the quantitative determination of bilirubin the icteric index is the preferred method. While a high percentage of cholesterol and cholesterol esters usually points to obstruction, on rare occasions they may occur in hepatic degeneration, and conversely, low percentage of cholesterol esters usually points to hepatic degeneration, but normal or even elevated percentage does not rule out hepatic degeneration. Likewise a positive galactose test points to degeneration, but a normal test does not exclude it; and tyrosinuria points to degeneration, but its absence has little significance.

Placental Immunity. S. Karelitz, C. K. Greenwald, and A. J. Klein. Proc. Soc. Exper. Biol & Med. 32: 1359, May 1935.

1. A Method of Determining Dosage of Placental Globulin in Measles Prophylaxis.

By comparing the titre of diphtheria antitoxin of maternal blood and the globulin extracted from human placentas of women who have had measles, equivalents are obtained. Knowing the dosage of immune adult blood serum in measles prophylaxis makes it possible to calculate the correct dosage of placental globulin extract, using the above method. The testing of ten placental extracts in measles prophylaxis in 70 exposed susceptible children gave results which indicate that this method of determining dosage of placental globulin is correct.

The measles antibody and diphtheria antitoxin are both obtained with the globulin extracted from placentas by precipitation with half saturated ammonium sulphate solution. The globulin extract of human immune placentas is effective in measles prophylaxis.

2. Comparison of Maternal Circulating Blood Immunity with that of Placental Fluid. In almost all cases the fluid obtained by squeezing the human placenta has the same diphtheria antitoxin titre as does the serum of the circulating blood of the mother drawn during labor, suggesting that the immunity of the new born is passive and is transmitted from mother to fetus by placental route.

Since this fluid has equal antibody content to that of maternal blood serum, it is suggested that this fluid obtained from placentas of women immune to measles be used in measles prophylaxis in similar dosage to that of immune adult blood serum.

An Unusual Ovarian Tumor Containing an Estrogenic Hormone. S. H. Geist and F. Spielman. J. A. M. A. 104: 2173, June 1935.

A theca-cell tumor of the ovary, the ninth case on record, occurring in a 21 year old girl, is described. Both grossly and microscopically it conforms to the "theca-cell" group in the newer classification of solid tumors of the ovary. Cholesterol could be demonstrated in it as well as an estrogenic hormone, which on extraction and titration gave a positive reaction so that one mouse unit could be demonstrated in the equivalent of 0.75 gm. of tissue. This enormous quantity of hormone produced by the tumor may explain the excessive uterine bleeding experienced by the patient.

Intestinal Tuberculosis; a Clinical, Roentgenological and Pathological Study of 2086 Patients Affected with Pulmonary Tuberculosis. E. Granet. Am. J. Digest. Dis. & Nutrition 2: 209, June 1935.

Tuberculous enteritis is a common disease and is present in most patients with advanced pulmonary tuberculosis. At the Metropolitan Hospital 2086 tuberculous patients were studied clinically and pathologically in an attempt to delimit criteria which would facilitate early diagnosis and better therapeutic results. This study was limited to moderately advanced and advanced non-toxic patients with pulmonary tuberculosis.

Roentgenoscopy of the gastro-intestinal tract revealed lesions in 37 per cent of the patients. Post mortem examination showed a relatively high degree of accuracy for this method of diagnosis. A history of gastro-intestinal symptoms was found to be unreliable as a diagnostic aid inasmuch as symptoms were absent in the majority of positive enteritis cases. Furthermore, the percentage of patients complaining of gastro-intestinal symptoms was only slightly greater in the positive enteritis group than in the negative patients. A study of the sputum showed tubercle bacilli in practically all positive enteritis cases. Similarly almost all fatal cases with enteritis had pulmonary cavities when examined at autopsy. Sigmoidoscopy revealed rectal involvement only in two of 150 patients examined.

Differential diagnosis is considered and principles of therapy are outlined.

Therapy is described briefly and emphasis is placed on treatment of the primary focus of infection as well as of the intestinal lesions.

Intermittent and Continuous Renal Glycosuria. A. E. Fischer. Am. J. Dis. Child. 50: 166, July 1935.

Three children with renal glycosuria were studied. Two of these excreted dextrose intermittently, the third constantly. The glycosuria was dependent solely upon the permeability of the kidney for dextrose. There were no symptoms of diabetes mellitus in the three patients. In the first two cases glucose appeared only when a high threshold was exceeded. In the third case glycosuria was present even when the blood sugar fell to 60 mg.

It seems unnecessary to separate renal glycosuria into two types, intermittent and constant, for they are similar and are differentiated only by the height of the renal threshold.

In two of the three cases benign glycosuria was found in members of the family. A brother and sister of the child, whose threshold was very low, likewise had continued on low threshold glycosuria, whereas the mother of one of the cases of intermittent or high threshold glycosuria had a similar condition. Even the type of renal threshold, therefore, appears to be an inherited characteristic.

Neurinoma of the Orbit. O. Sitchevska. Arch. Ophth. 14: 71, July 1935.

A woman, 28 years of age, suffered from a slowly progressing right exophthalmos for 2½ years. The vision remained unimpaired, although there were marked papilledema and peculiar folds in the retina; the refraction was changed from myopia to +5.00 hypermetropia. An orbital tumor was diagnosed.

The patient refused operation and two courses of roentgenotherapy were applied without result. Successful removal of the tumor was done by Dr. Wheeler through the skin and orbital fascia at the lateral canthus. Except for transient diplopia and dryness of the eye, the postoperative recovery was uneventful.

The histological structure of the tumor was atypical, so that the pathological diagnosis was uncertain; one group of pathologists diagnosed it as hemangioma, because of the abundance of capillaries and the fibroblastic nature of the tumor. Ewing classified it as neurofibroma, which was accepted by the author as the most justified diagnosis.

The Genesis of the Feeling of Unreality. C. P. Oberndorf. Internat. J. Psychoanal. 16: 296, July 1935.

The author traces the development of the feeling of unreality (depersonalization) to an attempt to repress a previous identification. The child has previously identified itself with the "thinking" parent after being rebuffed by the dull parent. The process of thinking becomes erotized and it assumes a feminine or masculine cast. "The feeling of unreality occurs when an attempt is made to repress such thinking as incompatible with the thought (and action) considered normal for the individual." The loss of the repressed part of the personality leads to a feeling of unrealness. A narcissistic wound to the ego and super-ego, in the form of prolonged loss of libidinal satisfaction, is considered a contributory factor in depersonalization. Attention is called to the relationship that exists between unreality, the feeling of stupidity and the deepest forms of thought block. In treatment, the libido must be deflected from thinking into emotional response.

The sequence of events in a typical case of unreality in the female presented as illustrative is as follows: identification at the Oedipus level with the parent of the opposite sex, emphasis on thinking as a masculine trait, psychic equation of head and phallus, indulgence in thinking as a pleasurable, sexually stimulating activity and the development of the state of unreality when the patient attempts to adapt herself to the type of thinking (and action) regarded normal for her sex.

A case is detailed to illustrate the thesis of the paper. The patient, as a child, received little affection from the parents. She was the youngest of four sisters and before her birth a boy was expected. Ever since the age of seven, she showed marked homosexual tendencies. In her adolescence she experienced difficulty in assuming femininity. She turned to abstract thinking as a source of "active thrilling pleasure" (erotization of thought). She considered thinking a masculine attribute and identified herself with her father who was a successful scientist. She also became expert in her father's recreational activities—trap shooting, horseback riding and photography. Even after marriage she continued her scientific studies for two years. When she ceased her scientific studies the unreality feeling became more intense. The feeling of unreality first developed when the patient began to seriously contemplate marriage. Her "body went through the movements of becoming engaged but she was just not along." Later during childbirth the same phenomenon occurred; her body—not she—gave birth to the child. The patient was partially restored to her feminine rôle as a real person by making conscious the influence of her unconscious homosexuality.

A Follow-up of Ulcerative Colitis (Non-Specific). B. B. Crohn and B. D. Rosenak. Am. J. Digest. Dis. & Nutrition 2: 343, August 1935.

Ninety cases of ulcerative colitis of the non-specific type were studied, seventy-five of which were followed from two to fourteen years. Approximately 74 per cent were cured or improved; 11 per cent were unimproved, and 15 per cent died. The latter figure includes deaths in which surgery was attempted.

Many of the "cured" cases remained cured, though followed six to ten years or more. Many of the "cured" cases had been ill as much as fourteen years.

The therapy consisted of strenuous use of specific and non-specific vaccines intravenously, as well as of the polyvalent anti-dysentery serum. The line of therapeutic approach recognized a possible or probable relationship between bacillary dysentery and non-specific ulcerative colitis.

Coronary Artery Thrombosis. With Treatment by Prolonged Rest in Bed and Low Calory Diet; Improved Prognosis. A. M. Master. J. A. M. A. 105: 337, August 1935.

Seventy-five patients with eighty-five attacks of coronary thrombosis were treated by immediate complete rest in bed for six weeks and by a regimen of low calory diet. Eight patients died, only one in a first attack.

Meticulous attention to detail is found to be essential in the management of a patient in an attack of acute coronary thrombosis. During the initial stage of shock the patient is given very little food. Low calory diets and small meals prevent dangerous gastro-intestinal-cardiac reflexes or mechanical disturbances; they also lower the basal metabolic rate and diminish the work of the heart. The heart is given an opportunity to heal and collateral circulation to form. Morphine and codeine are used liberally for severe pain. Glyceryl trinitrate, amyl nitrite, digitalis and epinephrine are considered dangerous. The prognosis for the first attack of coronary artery thrombosis is considered very good; usually a patient does not die in his first attack. About 70 per cent of the attacks occurred in hypertensive patients. Hypertension is generally present preceding a subsequent attack. It is probable that in women coronary thrombosis takes place only when hypertension is present. The prognosis is better in cases in which the blood pressure is not high. The prognosis of patients with infarcts on the anterior or posterior surface of the left ventricle is equally good. Multiple attacks of coronary thrombosis are common.

A patient who dies within twenty-four hours presumably has had previous attacks

of coronary thrombosis and has probably suffered from marked hypertension. If the patient lives through the first twenty-four hours, the chances are that he will survive that particular attack. Congestive failure is usually absent during the first attack of acute coronary thrombosis. Patients returned to their usual routine life or work following at least 62.5 per cent of the attacks and resumed light to moderate activity in at least 14 per cent.

Moulages; Their Preparation and Service to the Neuropathologist. J. H. Globus. Arch. Neurol. & Psychiat. 34: 355, August 1935.

A formula for the preparation of a casting substance is given. It is inexpensive and yields excellent results in the preparation of moulages depicting various lesions of the central nervous system.

On the Use of Chest Leads in Clinical Electrocardiography. I. R. Roth. Am. Heart J. 10: 798, August 1935.

The literature of chest leads in clinical electrocardiography is reviewed with critical comments on articles dealing with the subject. The early literature is found to be colored by an unwarranted enthusiasm on the subject, leading on the one hand to an overemphasis of the value of chest leads, and on the other to a tendency to underrate the significance of abnormalities in the standard leads.

The significant features of the conventional chest leads have been discussed. Objections are offered to the numerical designation of chest leads, and it is suggested that instead, chest leads be designated by well-known anatomical landmarks, indicating the location of the principal or chest electrode.

Right pectoral (Rp), left pectoral (Lp) and apical (Ap) leads are suggested as routine chest leads in clinical electrocardiography. In these the right arm attachment used in the standard leads serves as the fixed secondary electrode, and the principal or chest electrode is attached to the left arm cable.

It is concluded that while chest leads have found a permanent place in clinical electrocardiography, standard leads are still to be regarded as the more dependable, and a parallel study of standard lead tracings, particularly with reference to minor deviations, should be pursued with at least as much attention as the study of chest leads.

Primary Melanosarcoma of the Optic Disc. J. Levine. Arch. Ophth. 14: 229, August 1935.

This condition is extremely rare and has been reported in the literature only four times. The tumor cells arise in that portion of the optic nerve which lies inside the globe. From here they grow backwards through the lamina cribrosa into the retrobulbar portion of the optic nerve. The case reported was that of a fifty year old Porto Rican who came to have his eyes examined for glasses, at which time a large tumor mass was seen protruding from the upper portion of the optic disc. The vision was normal but enucleation was consented to. A pathological report of the eye is included in the article.

Putrid Abscess of the Lung Following Dental Operations. L. Stern. J. Thor. Surg. 4: 6, 547, August 1935.

Twelve of seventy consecutive and unselected patients with pulmonary abscess gave histories strongly suggestive of causes traceable to dental operations. In view of this high percentage, abscess of the lung is apparently a more common complication of dental surgery than is generally assumed to be the case.

Clinical and pathologic evidence point to aspiration as the usual mechanism in the production of putrid abscess of the lung. The anesthesia and other factors as-

sociated with tooth extraction offer optimal conditions for the aspiration of infected particulate matter. However, pulmonary abscess may and does occur after such operations without the aspiration of *gross* material, such as a tooth or filling. Gross aspiration did not occur in any of the cases reported in this series. More cases followed the use of local than of general anesthesia. This is probably accounted for by the fact that today local anesthesia is the method of choice in dental surgery.

Thorough investigation of the dental history in cases of abscess of the lung may reduce the percentage of cases formerly grouped as pulmonary abscess of unknown origin. The prevention of putrid abscess of the lung following dental procedures may depend on recognition and elimination of the hazards of aspirating infected particulate material dislodged during such procedures.

The Relation of Cholecystitis to Pathologic Changes in the Liver. R. Colp, H. Doubilet and I. E. Gerber. Ann. Surg. 102: 202, August 1935.

By means of a special Hoffman punch, biopsy of the liver was performed in 40 cases of acute and chronic cholecystitis without jaundice and in 9 with jaundice. Studies with finer histologic technique revealed no changes in the liver cells in biliary tract disease without jaundice. Focal liver cell degeneration seen in cases with jaundice represents a reaction to bile stasis and is in no way related to the primary disease of the gall-bladder. The periportal infiltrations observed in biliary tract disease are not specific for the disease, but represent a reaction of the liver to extrahepatic infection. Hepatitis is not an accompaniment of cholecystitis as evidenced by the absence of inflammatory and degenerative changes in the liver parenchyma.

Treatment of Intractable Nasal Hemorrhage by Injections of Moccasin Snake Venom. S. Dack. J. A. M. A. 105: 412, August 1935.

Two cases of spontaneous epistaxis of many years duration, which had proven refractory to conservative measures, were controlled by subcutaneous injections of moccasin snake venom. In one case in which a course of injections was pursued for five months, a definite therapeutic effect became manifest in three weeks and complete cessation of bleeding in three months. The antihemorrhagic effect persisted for two years. In the other case four injections were given at weekly intervals with an immediate cessation of bleeding following the first injection. Despite the early discontinuation of treatment the patient was then free of symptoms for eight months. The rationale of the procedure is discussed and the details of the treatment described.

Two Rare Instances of Cardiovalvular Disease Presumptively Syphilitic in Origin. A. R. Sohval. Arch. Path. 20: 175, August 1935.

These two cases showed microscopic and histologic lesions which, when considered in connection with those in other cases recorded in the literature, are extremely suggestive of syphilis. They point to the existence of tertiary syphilitic cardiac lesions that are not distinctly gummatous. It appears that, in addition to diffuse and localized gummatous lesions, a third type of syphilitic involvement can be recognized in which coagulation necrosis and giant cells are absent. The anterior leaflet of the mitral valve was involved in each case by extension from syphilitic disease at the root of the aorta.

VOLUME III MARCH-APRIL, 1937 NUMBER 6

JOURNAL
OF
THE MOUNT SINAI HOSPITAL
NEW YORK

THE REGENERATION OF HEPATIC DUCT EPITHELIUM

RALPH COLP, M.D.

[*From the First Surgical Service*]

Strictures involving any portion of the extrahepatic ducts present serious surgical problems for several reasons. The presence of a stenosis of either the hepatic or common bile duct leads eventually to an obstructive jaundice, and this, if complicated by infection, results either in a biliary cirrhosis, an acute cholangitis, or multiple liver abscesses. Permanent relief of the icterus and infection can only be obtained by the free and unobstructed drainage of bile. This may be aided either by the formation of an external fistula or by a dilatation of the stricture and accomplished by a resection of the obstructing scar tissue. The continuity of the biliary channels may then be restored and the bile can be freely delivered into the intestinal canal. The fact that innumerable operations have been advocated for the treatment of a strictured bile duct is, in itself, an open confession that the procedures used are not too successful. The methods variously employed for the treatment of stenosis have been:

1. Dilatation of the stricture with or without choledochoduodenal intubation.
2. Dilatation of the stricture and the implantation of a T tube with the long arm of the T leading through the abdominal wall.
3. The resection of the stricture with an end to end anastomosis of the duct without or with choledochoduodenal intubation.
4. The resection of the stricture with choledochoduodenal intubation, reconstructing the missing portion of the common or hepatic duct by utilization either of the gastrohepatic omentum, or of incised flaps from the duodenum or stomach.
5. Hepaticoduodenostomy or hepaticogastrostomy.
6. Cholecystoduodenostomy or cholecystogastrostomy.
7. The implantation of a persistent biliary sinus into either the stomach or duodenum.
8. The Kehr operation: hepatoduodenostomy, hepatogastrostomy or hepatocholangioenterostomy.

An exhaustive study of the results of these plastic operations has been made and reported by Eliot (2), and it was found that, while some excellent

results have been obtained, recrudescences of jaundice and cholangitis are not unusual. The causes of these recurrences may be attributed mainly to the re-formation of the stricture at the site of reconstruction. If this formation of scar tissue is to be eliminated, mucous membrane should be united to mucous membrane whenever feasible. It was Mayo who first emphasized this important principle when plastic procedures upon the bile ducts were contemplated. Naturally this is not always possible. There are those cases in which either because of the extensive nature of the stricture, an end to end anastomosis of the duct is impossible, or for anatomical reasons, a hepaticogastrostomy or hepaticoduodenostomy is not practical.

In 1910, Sullivan (8) reported a series of experiments on dogs in which he freely excised liberal portions of the common bile duct and then instituted biliary duodenal intubation bridging the defect left in the common bile duct by covering the exposed rubber tube with omentum. The tube was subsequently passed by rectum and the animals remained well. Histological studies of the reconstructed duct wall revealed that the hepatic duct epithelium had grown along the rubber tube. In fact he stated "that one inch of a sinus can be bridged by the proliferation of the duct epithelium downward, and duodenal mucosa upward for the same distance." This method was subsequently applied in human cases of extensive stricture of the common bile duct. It has been taken for granted by many that the epithelium of the choledochus possesses a high regenerative capacity. The end results of this particular operative procedure, however, have not been universally good. It has always been questionable (3) whether, even in the successful cases, there has been an actual regeneration of hepatic duct epithelium with a restoration of the reconstructed bile duct to its normal histology.

A careful review of the literature reveals no incontrovertible evidence that the procedure advocated by Sullivan results in an actual regeneration of hepatic epithelium. The following abstracted cases seem to show that hepatic duct epithelium regeneration is open to question.

The case of Jenckel (4) was a woman 52 years old from whom, on March 4, 1905, he removed a solitary calculus from the cystic duct. The patient was discharged three weeks later with a biliary fistula; she was readmitted and again operated upon (November 25, 1905) for recurrent icterus, and the choledochus was found transformed into solid scar tissue. After excision of the stricture, the right branch of the hepatic duct which was found to be dilated, was connected by a tube with the duodenum for a distance of eight centimeters. In spite of many complications this drain was removed on the thirty-second day when digital exploration showed a wide passage of the bile ducts. The edges of the operative incision were freshened and the wound sutured. At first there were occasional attacks of recurrent cholangitis, but at a re-examination four years later, the patient was in perfect health. Jenckel assumed that the epithelial lining of this new

choledochus consisted of epithelium growing down from the hepatic duct and up from the duodenum, and that the constant flow of bile gradually transformed the character of this mixed epithelium into the type normally lining the choledochus. Dr. Ellsworth Eliot, Jr. (2) states that Jenckel recently informed him by letter that this patient died eleven years after the operation, and that, although there was a complete autopsy, no mention was made of the histology of the reconstructed duct.

Jenckel also reports a similar case of De Graeuwe's (1) in which, following the excision of part of the choledochus, there was a proliferation of the epithelium of the choledochus and hepatic duct stumps, forming the lining of the new bile duct. It seems rather strange that in a recent personal reviewing of this case, De Graeuwe makes no mention of the proliferation of epithelium.

Propping (6) reported the case of a woman 36 years old upon whom cholecystectomy was performed in the fall of 1909. A biliary fistula with jaundice and biliary colic developed five weeks postoperatively. At re-laparotomy on December 3, 1909, the choledochus was found embedded in adhesions and transformed into scar tissue in its mid portion. Four centimeters of the scar tissue were removed, and a T drain was inserted connecting the two ends of the choledochus. This drain was removed after three weeks, leaving a biliary fistula which was completely healed at discharge on January 3, 1910. On April 4, 1912, the patient was readmitted because of recurrent biliary colic and jaundice. Re-laparotomy on April 22, 1912, revealed that the choledochus was patent from the duodenal papilla to the porta of the liver where a stricture was found beyond which the dilated bile duct—the hepatic duct or one of its branches—was filled with retained bile. The choledochus was again incised two centimeters below the stricture, that is, in the postoperatively reformed duct. Propping stated that "its epithelial lining" macroscopically resembled the epithelial lining of a normal choledochus. A T tube was again inserted as at the previous re-laparotomy. This drain was removed after six weeks, or on May 30, 1912. There was a gradual and uneventful recovery. Although the gross appearance of the lining of the duct suggested epithelium, there was no histological verification of this assumption.

Simon (7) recorded the case of a male patient, 34 years old, with a history of increasing jaundice for six weeks. The condition was diagnosed as either a stricture of the choledochus, or an occlusion of the papilla of Vater by a tumor. At operation on September 24, 1927, the entire choledochus was found to be comparatively narrowed. The papilla of Vater was patent and the pancreas felt normal. The hepatic duct presented a stricture. Two centimeters of the hepatic duct were excised. The remainder of the duct was connected with the choledochus by a thin T tube which was covered with an omental flap. An attempt was made to remove the T tube nineteen days postoperatively, but, unfortunately, the rubber broke off

at the bifurcation. In spite of this accident the patient made a very good recovery. Since the remaining drain could not be spontaneously discharged through the narrow choledochus or the papilla, it was removed at a second operation three months later. At that time the newly formed passage resembled macroscopically a normal bile duct. Simon stated that it had been formed by epithelium regenerated from the hepatic duct and the choledochus.

Three years later, in 1920, the patient was reported to be in good health and free of postoperative complications. The author considered that the postoperative result of this case confirmed the statements of Propping and others concerning the regenerative capacity of the epithelium of the excretory ducts of large glands. In this case, as in Propping's, there was no microscopic verification of a macroscopic diagnosis.

The case herewith briefly reported is of unusual interest because the patient died of an intercurrent disease eighteen months after a reconstruction of the common bile duct. A post mortem was obtained and special attention was given to a microscopic study of the newly formed duct.

CASE REPORT

History and Clinical Course[1] (Adm. 291461). A woman, 60 years old, was operated upon on March 3, 1926, for an acute cholecystitis with a pericholecystitic abscess. During the course of the cholecystectomy the common bile duct was accidently divided in part and a choledochostomy was performed. She subsequently developed a biliary fistula which eventually healed. However, a stricture of the common bile duct soon developed. An exploratory laparotomy was performed in June 1928. A stricture of the choledochus was found and excised, and a choledochoduodenal intubation was done covering the exposed rubber tube with omentum. There was an uneventful recovery. The intubated tube was passed by rectum some months later. She never complained of any further biliary symptoms. Examination of the urine failed to disclose bile and the blood bilirubin was normal at all times.

She died two years later, March 23, 1930, from an intestinal hemorrhage complicated by a coronary artery thrombosis.

Post Mortem Findings. The autopsy report, as far as the liver and bile ducts are concerned, reads as follows: "There was some difficulty in separating the dense adhesions about the operative scar to which the liver, omentum and colon were bound. The liver was somewhat decreased in size. Its surface was granular in an irregular fashion, most marked at the edges with a very deep and deforming scar along the inferior margin not far from the porta hepatis where lobulations not unlike the picture of a hepar lobatum were seen. The gall bladder had been removed. The

[1] Patient presented before the New York Surgical Society. See Annals of Surgery, Vol. XC, No. 3, 458–459, Sept., 1929.

common duct region was the site of dense cicatrizing scar tissue. Dissection revealed within this mass an apparently normal length common bile duct and an apparently normal hepatic duct, and between them for a distance of fourteen millimeters a canal, epithelially lined but smooth walled and without the usual duct structure. There was neither a stenosis nor a narrowing and the biliary passages were patent from the duodenum through to the porta hepatis.

The intrahepatic biliary radicals were apparently not dilated and showed no gross changes. The liver cut with increasing difficulty and on gross section the parenchyma was yellowish green in color, and without the usual liver architecture. There were fibrous streaks running throughout and there was apparently a marked increase of connective tissue separating the parenchyma into irregular areas. There were two small adenomas. The liver weighed 1200 gm.

Microscopic sections demonstrated that the liver cells were undergoing albuminous degeneration and that there were a number of small fat vacuoles spread diffusely through the lobules. There was an increase in the connective tissue of the portal spaces, especially about the larger ducts. In addition, there were small areas of fibrosis near the periphery of the lobules with necrosis of the liver cells and round cell infiltration. According to Dr. Paul Klemperer, a longitudinal section of the common bile duct showed a six millimeter hyaline thickening of the wall which bordered on either side of a thin walled duct. The surface of this thickening which was about three times the width of the common duct wall above and below, was lined by one layer of flat spindle cells. The thickening was composed of lamellated connective tissue fibers. The remainder of the duct wall was negative except for the lining cells which were markedly flattened."

COMMENT

The macroscopic appearance of the mucous membrane of the reconstructed duct in this case is similar to that in the cases reported by Jenckel, Propping and Simon. It appeared to be lined by epithelium, yet there was absolutely no microscopic evidence that hepatic duct epithelium had regenerated at all in the area of the reconstructed duct. However, in spite of the fact that the reconstructed part of the common bile duct was lined by connective tissue, the canal was found adequately patent at post mortem. Moreover, clinically, the patient never presented any evidence either of jaundice or active cholangitis.

This case has more than academic significance. It demonstrates that the success of the Sullivan McArthur (5) procedure need not necessarily be attributed to a regeneration of the hepatic duct epithelium. A biliary canal lined by connective tissue may prove an efficient canal provided that its diameter is ample, that the intraductal pressure is sufficiently high,

and that the extraductal pressure of contracting scar tissue is not great enough to obliterate the channel.

If bile ducts with loss of substance need to be reconstructed with biliary duodenal intubation used as a basis, no dependence should be placed upon the regeneration of duct epithelium. There is no conclusive evidence up to the present that hepatic duct epithelium regenerates. Connective tissue probably bridges effectively the gap between the ends of hepaticus or choledochus following resection of stenosing scar tissue. The largest sized rubber tube that can be intubated should be used, and moreover, it must be allowed to remain in situ until the newly formed canal is of sufficient diameter and rigidity to resist the forces which otherwise cause the formation of a new stricture.

BIBLIOGRAPHY

(1) DeGraeuwe, A.: Contribution a la Étude de la Chirurgie du Choledogue. J. Med. de Bruxelles, 13: 249, 1932.
(2) Eliot, E.: Personal communication.
(3) Douglas, J.: Strictures and operative injuries of the bile ducts. Ann. Surg., 84: 392, 1926.
(4) Jenckel, A.: Beitrag zur Chirurgie der Leber und der Gallenwege. Deut. Ztschr. f. Chir., 104: 1, 1910.
(5) McArthur, L.: Repair of the common bile duct. Ann. Surg., 78: 129, 1923.
(6) Propping, K.: Regenerierung des Choledochus nach Einlegen eines T-Rohres. Beitr. z. klin. Chir., 83: 369, 1913.
(7) Simon, L.: Hepatico- and Choledocho-duodenostomy by Means of Rubber Prosphesis. Beitr. z. klin. Chir., 120: 344, 1920.
(8) Sullivan, A.: Personal communication, and Reconstruction of the bile ducts. J. A. M. A., 58: 2026, 1912.

SOLITARY LIVER ABSCESS

A Report of Two Cases

A. J. BELLER, M.D.

[*From the Surgical Service of Dr. Ralph Colp*]

Case 1. History (Adm. 380210). A twenty-four year old male was admitted to the hospital on April 5, 1935. He was born in Russia and had been in the United States for fifteen years, spending his entire time in New York City or its immediate vicinity. Thirteen weeks before his admission, he suddenly experienced pain in the right lower chest, which was worse on deep inspiration; with this there developed slight fever and occasional cough. The condition was diagnosed as a dry pleurisy and his chest was strapped, giving him considerable relief. When the strapping was removed ten days later, the pain recurred. Three weeks after the onset of the chest pain, he experienced swelling and tenderness of the right calf, lasting about ten days. This condition was diagnosed as phlebitis. During the week prior to his admission to the hospital, the pain had become continuous, sharp, stabbing, and well localized in the lower anterior right chest and the retrosternal region. Throughout his illness, cough and slight expectoration had been present; the latter was not foul, blood-streaked or bloody. The temperature ranged betwen 99° and 101°F. with an occasional rise to 102° or 103°F. There were daily profuse sweats, but no chills. There was no vomiting, diarrhea, melana, hematemesis, jaundice, blood or mucus in his stools. The latter averaged two a day. The patient had lost thirty pounds in three months.

Examination. The patient, a fairly well nourished and developed male, appeared chronically ill and pale. The chest was negative except for slight tenderness of the chest wall at the right base. There was exquisite tenderness over the liver from the right nipple down. There was marked tenderness over the right costal margin and the right upper rectus was spastic. Liver dullness percussed to the costal margin.

Laboratory Findings. Hemoglobin, 80 per cent; white blood cells, 18,200; polymorphonuclear neutrophiles, 75 per cent; lymphocytes, 21 per cent; monocytes, 3 per cent; eosinophiles, 1 per cent. The urine showed a trace of bile and urobilin. A blood culture was negative. The blood urea was 7 mgm. per cent. The direct Van den Bergh was faintly positive. Icteric Index was 6. The cholesterol was 105 mgm. per cent. Cholesterol ester was 50 mgm. per cent. Bilirubin was 1.0 mgm. per cent. A blood complement fixation for amoebae could not be done because of the

lack of material. X-ray examination of the chest showed the lungs and the diaphragm to be normal.

Course. The history of fever and sweating, associated with epigastric pain of thirteen weeks' duration; the tenderness over the liver, and the latent icterus, comprised the important points in the clinical picture. Repeated examination of the stools failed to reveal amoebae and sigmoidoscopy failed to show any evidence of amoebic colitis. Emetin therapy was begun and the patient received a full course of treatment. His general condition improved greatly although the fever persisted and his tenderness gradually localized to the anterior hypochondriac region. In view of these findings, a diagnosis of liver abscess was made and operation was decided upon.

Operation. On April 17, 1935, under gas, oxygen and ether anesthesia, the abdomen was opened by means of a right upper muscle splitting incision extending to the epigastrium. The gall-bladder, stomach and duodenum were found normal. The right lobe of the liver was enlarged, extending several fingers below the costal margin and felt soft in consistency. The latter was aspirated in several places but no pus was obtained. The exploration was continued toward the left side and on inspection it was found that the falciform ligament was swollen and edematous and closely adherent to the liver. This portion of the liver also appeared larger and softer than the normal although no bulge or mass could be seen or felt. An aspirating needle was inserted at this point and non-foul smelling, turbid fluid was obtained. The subphrenic space and peritoneal cavity were packed off, and the abscess was opened with a dressing forceps and finger. The abscess cavity was the size of a grapefruit. A rubber tube was inserted, and the latter was surrounded by packings. The abdominal wall was closed in layers.

Postoperative Course. The patient did poorly for several days, running high fever, and appearing acutely ill. The drainage from the wound was profuse but gradually decreased in amount. The fever subsided and the patient was discharged on the twenty-fifth postoperative day, with the tube in situ. When last seen on December 5, 1935, the wound was found firmly healed, the patient had gained forty-two pounds in weight, and felt well. Pus from the abscess showed presence of amoebae.

Case 2. History (Adm. 384264). A forty-two year old male had previously been admitted to this hospital on May 23, 1932, with symptoms of an ulcerative colitis, of seven years' duration. He had six to seven daily movements of pus and blood but no diarrhea or pain. Examination of the stool showed B. coli, streptococcus hemolyticus and other organisms, but no amoebae. He was treated with emetin hydrochloride and deodorized tincture of opium. At that time he had only one bowel movement a day. He gradually improved and left the hospital. The patient also had a bi-

lateral sphenoethmoidectomy for purulent sinusitis. Since his discharge from the hospital three years ago, he complained of the occasional passage of blood with his stools. He had been taking daily enemas of tannic acid solution. Two weeks before this present admission, he noticed a slight sticking retrosternal pain which was constant in character and radiated to the epigastrium. He also began to vomit after many of his meals. Four days ago there was a severe shaking chill; this was followed by increase in the severity of the epigastric pain and the temperature rose to 103°F. On the morning of admission there was another shaking chill.

Examination. The patient gave the impression of being chronically ill. His temperature was 103°F.; the pulse was 120. The nose showed evidence of atrophic rhinitis; the left antrum was tender, and there was a post nasal drip. The lungs showed constant respiratory râles over the right apex and the infraclavicular region. There was marked tenderness in the epigastrium and right side of the abdomen, without spasticity. Rebound tenderness was present throughout. There was no distention.

Laboratory Findings. Hemoglobin was 88 per cent; white blood count, 24,250; polymorphonuclear neutrophiles, 83 per cent; monocytes, 15 per cent. The stools were guiac negative. The urine was negative except for occasional increase in urobilin. Blood urea was 12 mgm. per cent; sugar 100 mgm. per cent. Icteric Index was 7. The cholesterol was 190 mgm. per cent; cholesterol ester was 33 mgm. per cent. The blood Wassermann test was negative. Agglutination for typhoid: Para A and B and 5 dysentery strains were all negative. X-ray examination of the chest revealed no abnormality. Sigmoidoscopy showed a finely granular mucosa studded with innumerable tiny ulcers for a distance of 15 cm.

Course. The patient ran a fluctuating temperature up to 104°F. He complained of pain in epigastrium and the right upper abdomen. Tenderness and sense of fullness in the epigastrium was noted, but no rigidity. In view of these findings, various possibilities were considered: ulcerative colitis with peritoneal irritation, ulcerative colitis with possible perforation and abscess formation, and liver abscess. While the tenderness in the epigastrium gradually became less pronounced, the patient developed marked tenderness over the liver and axillary region. The persistent fluctuating temperature, the epigastric pain, and the presence of tenderness over the liver, suggested the possibility of a liver abscess.

Operation. Since the location of the abscess was thought to be situated in the right lobe of the liver anteriorly, a preliminary aspiration through the anterior chest wall was done, but no pus was obtained. On September 9, 1935, under gas, oxygen and ether anesthesia, the abdomen was then opened through a right upper muscle splitting incision. The organs in the upper abdomen, especially the transverse colon, were explored and all were found negative. The liver appeared enlarged, but there were no areas of softening or fluctuation. The right and left lobes of the liver were

aspirated several times but no pus was obtained. The incision was enlarged upward, exposing the dome of the right lobe of the liver, where a number of fine adhesions between the diaphragm and the upper surface of the liver were found. These were freed and this portion of the liver was aspirated and pus obtained.

In view of the high situation of the lesion it was considered advisable to drain the abscess through the chest wall. Portions of the 11th and 12th ribs and cartilages were then removed. In trying to mobilize and push the pleura upward, the latter was opened, but this was promptly closed and packed. The dome of the liver was now exposed, the abscess which was situated deeply in the liver, was opened by means of a blunt instrument and the finger. A tube was inserted into the abscess cavity, as well as a packing to control bleeding. The entire area was then packed off with iodoform gauze and the peritoneal cavity was closed in layers. Examination of the pus from the abscess failed to reveal the presence of amoebae. Gram negative bacilli were found but could not be identified.

Postoperative Course. The patient ran a febrile course for four and a half weeks. The temperature varied between 102° and 103°F., and only at the end of his stay in the hospital, did it reach normal. The discharge from the liver abscess was at first profuse, but rapidly diminished in amount. Examination of this discharge at various intervals failed to reveal the presence of amoebae. The patient also developed a sympathetic effusion in the right chest which was aspirated on several occasions and gradually cleared up. In view of the persistent temperature and the presence of chest signs, the possibility of the presence of a subphrenic abscess was entertained. The subphrenic space was therefore aspirated, but no pus obtained. He was treated with emetin and anayodin. He showed gradual but constant improvement, his temperature returning to normal on the twenty-ninth postoperative day, and he was discharged on the thirty-eighth day with the wound well healed except for a small sinus which discharged a slight amount of pus. Recent examination on January 16, 1936, found the wound entirely closed and the patient feeling well. He had gained considerable weight and passage of blood and pus in his stool had stopped.

COMMENT

In the first case, the source of infection was not determined. There was no history of exposure, and the patient never presented any symptoms suggestive of dysentery, yet a large solitary amoebic liver abscess was found. The clinical picture of the existence of an amoebic abscess, without intestinal symptoms, occurs quite frequently. Ochsner and DeBakey report that in a series of 318 cases, 131, or 41.1 per cent gave no history of diarrhea. It is possible that in this group of cases the intestinal lesion is on the right side, so that the accumulated fluids are absorbed before they

reach the sigmoid. In lesions in the left, large bowel, however, the fluid is not absorbed and results in frequent evacuation of watery stools.

In the second case, however, although the source of exposure was not determined, the patient gave a definite history of an ulcerative colitis with diarrhea and bloody stools. No amoebae were found in pus from the liver abscess, or in the stool at the time of his first admission. It is, however, known that solitary liver abscess is rarely, if ever, seen as a complication of non-specific ulcerative colitis. This type of abscess might be classified as idiopathic because of the absence of amoebae, and yet it seems highly probable that the liver abscess and the colitis in this case may have been amoebic in origin.

Amoebi are the most common cause of solitary liver abscess; about one-twelfth of those suffering from amoebic dysentery develop liver abscess. Amoebiasis is most frequently found in the tropical countries where the distribution varies greatly, although considered uncommon in temperate and cold climates. This condition is seen quite often in the northern part of our country. In 1933, an epidemic of this disease was reported in Chicago, and from 1933 to 1934, 121 cases of amoebic infection were reported in New York City. It is probable that the disease remains endemic in various sections of the country. Europeans residing in the tropics are more predisposed to the disease, and the death rate is twenty times higher among the Europeans than among the natives.

Men are more liable to liver abscess than women, the rate being about seven to one. The relative immunity of the female sex is the result of their more temperate habits and of their being less exposed to the exciting causes of the disease.

The abscess is situated in the right lobe in from 70 to 80 per cent of the cases; in the left lobe, in from 5 to 15 per cent, and in the lobus Spigelli in from 2 to 5 per cent.

Maclean found both lobes to be involved in 9 per cent of his cases. The upper and posterior part of the right lobe is the common seat of abscess. In explanation of the comparative frequency of involvement of the right lobe, it will be borne in mind that it is six times the size of the left lobe.

It is estimated that the abscesses are single in 75 per cent, double in 11 per cent, and multiple in 14 per cent of the cases. A point of great importance is the preponderance of single abscesses, and these usually recover following operation. A hepatic abscess is rounded in shape provided its uniform expansion is not interfered with. It often becomes irregular and even digitates, from the fusion of neighboring collections of pus. The size of an abscess, when it enters its surgical phase, varies greatly according to its age, its stage of progress, and the resistance of the adjoining tissues. Some contain only two or three ounces of pus, in others, one hundred and fifty or more ounces may be evacuated. The contents of an abscess may be creamy but are more frequently of a chocolate color, and viscid or

watery, the so-called hepatic pus. Amoebae may be present or not. Bacteria are present in varying proportion of cases, although in a considerable number of instances, liver abscesses are sterile. It is probable that bacteria are present in all cases at the beginning but subsequently die. When amoebae are present, they are most abundant in the smaller abscesses. They are found in the pus, in the wall of the abscess, within the capillaries, and in the thrombi of the portal vein.

REFERENCES

Allbutt, T. C., and Rolleston, H. D.: System of Medicine, Vol. 2, Part 2, Third Edition, 1910. The MacMillan Co., London.

Maclean, W. C.: Diseases of Tropical Climates; Lectures delivered at the Army Medical School, London, 1886.

Ochsner, A., and De Bakey, M.: Diagnosis and Treatment of Amebic Abscess of the Liver. Am. J. Digest. Dis. & Nutrition, 2: 47, 1935.

Mencher, William: Amebic Abscess of the Liver, J. of Mt. Sinai Hosp., 2: 259, 1936.

"FEVER OF UNKNOWN ETIOLOGY," SUBSEQUENTLY FOUND TO BE DUE TO LYMPHOGRANULOMA VENEREUM

BORRIS A. KORNBLITH, M.D.

[*From the Medical Services of Dr. George Baehr and Dr. B. S. Oppenheimer*]

The Frei test because of its specificity has been very helpful in the diagnosis of some obscure cases with an unexplained febrile course which otherwise would have been classified as "fever of unknown etiology." Two such cases with unusual symptomatology and clinical course were identified by means of this test as atypical forms of lymphogranuloma venereum.

CASE REPORTS

Case 1. History (Adm. 382523). A thirty-eight year old, white, married man had had frequent upper respiratory infections. He suffered from chronic purulent otitis media until five years before admission. Nine days before admission to the hospital he awoke with a slight headache, weakness, and dizziness. The temperature was up to 103°F., and from that time on until he entered the hospital his temperature varied between 101° and 103°F. He had no other symptoms.

Examination. The patient was well developed and well nourished, appearing moderately ill. The temperature was 101.2°F.; the pulse was 90 per minute; respirations, 24. The left eardrum had a large perforation; the remainder of the drum was thickened; a moderate amount of discharge was present in the external auditory canal; his hearing was good. The right eardrum also showed some thickening. The pharynx was slightly reddened. Percussion over the left upper incisor tooth elicited pain.

Laboratory Data. The blood pressure was 130 systolic and 82 diastolic. The hemoglobin was 86 per cent (Sahli). The white blood count was 12,400; non-segmented polymorphonuclear cells, 30 per cent; segmented polymorphonuclear cells, 44 per cent; lymphocytes, 23 per cent; monocytes, 1 per cent; eosinophils, 2 per cent. The blood urea nitrogen was 15 mg. per 100 c.c. The blood Widal, para-Widal A and B, agglutination against B. melitensis and B. abortus, and Felix Weil tests were all negative. Cultures of the urine showed no growth. The stool was negative for typhoid bacilli. X-ray examination of the chest revealed a moderate enlargement of the heart, particularly to the right; the cardiac shadow was pear-shaped. Such an appearance was considered consistent with anemia or prolonged fever. Urine examination revealed scattered white blood cells

with a few clumps. Prostatic massage yielded 2 c.c. of milky fluid which contained no pus cells. Dental examination revealed no foci of infection. The otologists felt that the pathological condition in the ears could be ruled out as a focus of infection responsible for the present condition. The otolaryngologists suggested the probability that the patient was suffering from suppuration of the paranasal sinuses as some inspissated pus was obtained by irrigation from both antra and the left sphenoid. Staphylococcus aureus was cultured from this exudate.

Course. The patient remained in the hospital for twenty-one days. During that time his temperature ranged between 99°F. and 101°F. It was assumed at first that the febrile course could be readily explained on the basis of the presumable sinusitis.

Two weeks after the patient left the hospital he complained of swelling in the region of the left groin. His fever had persisted throughout the preceding two weeks. He had lost about 15 pounds in weight and had been unable to go on with his work. The Frei test was then carried out. Two different antigens were used, and both tests were positive. Control tests done simultaneously showed no reaction. On further questioning, the patient admitted extramarital sexual intercourse with a negress. On examination the inguinal lymph nodes were found enlarged and matted together; on the right side the inguinal nodes were also enlarged but to a lesser extent; they were more discrete than those on the left. Two weeks later suppuration took place; a sinus formed and discharged about 15 c.c. of loose, brownish, purulent material.

Treatment. It was considered advisable to treat this man with intradermal injections of different dilutions of Frei antigen in an effort at desensitization, and 0.1 c.c. of Frei antigen was administered intradermally twice weekly in progressively increasing concentration, the highest dilution being 0.1 c.c. of 1:1000. The patient's malaise and fever promptly subsided when the abscess began to discharge. This leads one to conclude that the continued fever was due to lymphogranuloma venereum from the very beginning.

Discussion. In reviewing this case it may be noted that one finding which would indicate a possible focus of infection was the urine examination. This, at the time of admission to the hospital, revealed white blood cells on three different examinations. The urine afterwards became clear. It is likely that this was in the nature of a urethritis due to lymphogranuloma venereum. The fact that no inguinal enlargement was noted at the onset of the disease is consistent with the evolution of the lesion, as is now known. The history of a primary lesion is present in only a minority of the cases suffering from this disease. The glandular enlargement occurs always between three and six weeks after definite contact. This case serves to emphasize the fact that among the conditions which for lack of more definite findings are classified at times as "fever of unknown etiology," lymphogranuloma venereum should be seriously considered.

Case 2. History (Adm. 371372). A forty-five year old white man noted a urethral discharge three weeks before admission. One week later he developed pain in the thighs and a painful lump in the left groin. This was accompanied by vomiting and rise of temperature to 104°F.

Examination. The patient was an obese man, almost completely blind, with traumatic dislocation of both lenses (of ten years' duration), which were cataractous. There was also bilateral detachment of the retina. Occasional râles were present at the base of the left lung. There was a systolic murmur at the apex. The liver was palpable 2 cm. below the costal margin. The femoral and inguinal nodes were hard and barely palpable bilaterally.

Laboratory Data. The blood pressure was 135 systolic and 85 diastolic. The hemoglobin was 90 per cent. The white blood count was 13,900; polymorphonuclear cells, 70 per cent; lymphocytes, 28 per cent; monocytes, 2 per cent. The urine examination revealed white blood cells but no organisms. Prostatic smears were negative.

Course. The exact source of the fever was difficult to determine. However, the frequency of urination and the presence of white blood cells in the urine pointed to the urinary tract as the seat of infection. Nevertheless, the presence of râles in the chest, and roentgenograms suggested the presence of a subacute bronchial infection. This and a moderate injection of the pharynx were considered as probable causes of the fever. After three weeks of continued fever, attention was focused upon the presence of the non-tender, shotty, hard, bilateral inguinal and femoral nodes, previously considered to be clinically insignificant. In view of the antecedent history of urethritis followed by a tender swelling in the left groin, a Frei test was done. This was definitely positive. Biopsy of the glands was then considered advisable. At operation, suppuration was found within the inguinal nodes; the gross appearance was very suggestive of lymphogranuloma venereum, and this was confirmed by histological examination. Cultures of the pus removed at operation were sterile. Further inquiry revealed the fact that the patient had developed the urethral discharge soon after having had intercourse with a colored woman three weeks before admission to the hospital.

Follow-up. The incision and drainage of the inguinal glands was followed by prompt subsidence of symptoms. The wound healed and he was discharged from the hospital. He reappeared at the clinic one year later (October 1935) with a history of frequency of urination, pain in the thighs, and fever. Urine examination revealed pus clumps. The inguinal glands were moderately enlarged bilaterally. The Frei test was again found positive. The blood Wassermann test was negative. The patient gave a history of again having had intercourse with a negress in spite of the fact that he was warned about his condition and its probable source. The exposure occurred nine days before his visit to the clinic. No contraceptives had been used and the symptoms began two days after this exposure.

The patient continues to have fever, and still has urethritis, and inguinal glandular enlargement. It is probable that the patient is suffering from reinfection, though reinfection with the virus of lymphogranuloma venereum is still an open question.

Discussion. These two cases are presented as instances of lymphogranuloma venereum which ran a clinical course classifiable as "fever of unknown etiology." The most important single aid in the diagnosis was the Frei test, which in one case was confirmed by biopsy. The histories of these two cases were also helpful. The primary lesion, which appeared as urethritis in both of these cases, is often overlooked. Some cases of unexplained glandular enlargement with fever, which subside spontaneously, resemble closely the clinical picture of infectious mononucleosis. To establish a correct diagnosis a Frei test is exceedingly advantageous, as illustrated by the above two cases.

TREATMENT

In the treatment of cases of lymphogranuloma venereum varied methods were used in accordance with the type of involvement found and at the outset, procedures and drugs recommended by other authors were tried out.

In cases showing inguinal gland involvement, incision and drainage and intradermal administration of Frei material, were employed with good effect. The injections of foreign protein, i.e. typhoid vaccine and yatren, and the use of emetine and arsphenamine were found ineffective. One patient developed lymphogranuloma venereum during the course of receiving antiluetic treatment. This patient's disease progressed unabated until treatment with the Frei material was begun. Complete excision of the lymph nodes involved is now considered inadvisable, and in most cases anatomically impossible because of the concomitant involvement of the pelvic glands. The most satisfactory results obtained thus far were with the intradermal administration of the Frei material: 0.1 c.c. every other day for an indeterminate period until the patient becomes asymptomatic. The immediate effects are constant and uniform. There is a cessation of pain in their groins and the prompt loss of all co-existing constitutional symptoms as early as after the second injection. The local lesions begin to subside and the glands gradually diminish in size and become harder. The patient becomes asymptomatic, though the Frei test remains positive at the end of the treatment. This treatment has proved efficient even when deep fluctuation was felt and there was a reasonable indication for incision and drainage. Where the treatment time with other methods was about one week in the hospital and six months for dressings in the clinic, the present method shortens the period of disability and treatment to about six weeks and obviates operative intervention.

The treatment of cases with rectal involvement varied according to the

surgical indications. Colostomy was necessary in only three female patients. Two of these were re-operated through a parasacral incision and the rectum was freed from perirectal fat in an effort to relax the stricture. This proved impossible in one case and gave poor result in the other. Relatively few cases of this disease come to colostomy. This is readily understood when it is realized that stricture formation actually represents a healed stage of the local disease, and not a progression to complete mechanical occlusion. The lesion at this time is no longer of the infiltrative nature and rarely leads to complete obstruction of the lumen. The narrowing which is produced by the proctitic and periproctitic inflammatory scarring, is insufficient to produce complete obstruction. The treatment, therefore, is directed toward a mechanical relief of the symptoms arising from the stenosis. Among these palliative methods are bougie and digital dilatation. Supplementary methods used are the instillation of cotton seed oil and olive oil used as retention enema over night. Foreign protein therapy arsphenamine and local strong antiseptics were all found of no value. Intravenous tartar emetic was found of no value. The use of the Frei material intradermally was found useful by reducing pain and constitutional symptoms. The local lesion, however, was anatomically unaltered even after two years of treatment.

The genital lesions responded well to the intradermal injection of Frei material while other methods were of little value.

NODAL RHYTHM IN AN INFANT EIGHTEEN MONTHS OF AGE

SIDNEY D. LEADER, M.D.

[*Pediatric Service and Cardiographic Laboratory*]

CASE REPORT

History (Adm. 375957). A male negro, 18 months of age, was admitted to the hospital on January 23, 1935 with a 3 day history of cough, fever, listlessness, malaise and anorexia. The cough had become rapidly worse and his temperature remained at about 104°F. during this three day period. His birth and development were entirely normal. He had no previous illnesses save for a rectal fissure for which he was treated at the dispensary of this hospital 6 months ago. During his observation at the clinic no episodes similar to the present cardiac condition were ever observed.

Examination. The patient was a well nourished infant, quite ill, slightly cyanotic, with breathing labored and rapid. His skin was hot and dry; the throat was injected; the tonsils were large, cryptic, edematous and congested. He had a mucopurulent nasal discharge. There was impairment of the percussion note through the entire chest mainly at both bases. The breath sounds were muffled and harsh; many fine râles were heard throughout the chest. There was heard a systolic murmur over the precordium. The temperature was 104°F., the pulse 140 and the respirations 54 per minute.

Course. A diagnosis of bronchopneumonia was made and this was confirmed by X-ray examination of the chest which showed a bilateral bronchopneumonia involving both lower lobes. The blood count revealed Hemoglobin 65 per cent; Red blood cells 4,030,000; White blood cells 17,600, with 62 per cent Polymorphonuclear leucocytes. The urine was normal. The blood pressure was 80 systolic and 52 diastolic.

The treatment consisted of routine care without medication. The temperature remained elevated for 8 days, then dropped to normal during the balance of his stay in the hospital. The systolic murmur which was heard on admission was not considered to be of organic character; it persisted throughout the patient's stay at the hospital.

Twenty-four hours after admission, during routine examination, it was observed that the child's pulse rate had dropped to 75 per minute, having been 140 at the time of admission. This was not accompanied by any change in the general condition of the child. Subsequently, the pulse rate gradually dropped further until 3 days later when it was 54 per minute,

retaining this rate until the present time. This drop in pulse rate was noted when the temperature was at its height and persisted during the subsequent 7 days of fever. The pulse rate and heart rate were identical at all times.

An electrocardiogram (Fig. 1) was reported as follows: "The heart has an ectopic rhythm of 60 to 90 per minute, possibly of nodal origin. The P-wave when present is inverted. P-R interval varies between 0.06 and 0.14 seconds." Subsequently repeated electrocardiograms substantiated the diagnosis of nodal rhythm.

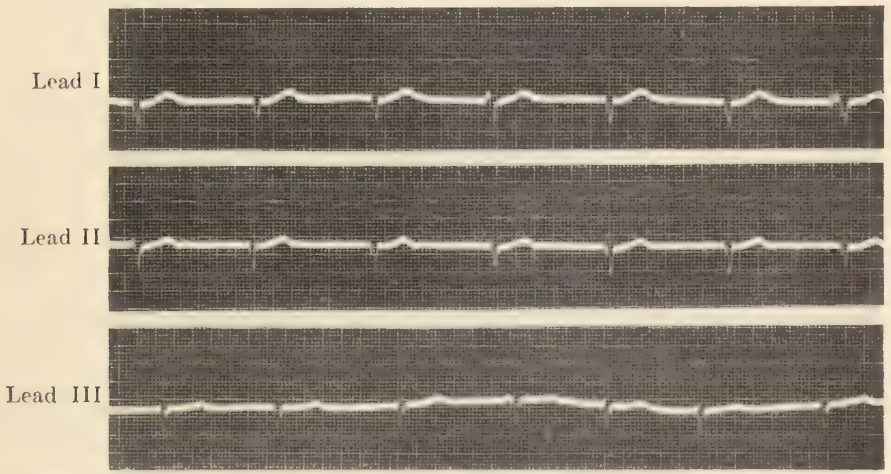


FIG. 1. Electrocardiograph of patient reported. In all 3 leads a nodal rhythm is present. P-waves can be discerned in several cycles. In lead III there is a period of transitory sinus rhythm.

COMMENT

Nodal rhythm (or better, auricular ventricular rhythm) is that condition in which the contractions of the heart are controlled by the lower pacemaker, i.e. the auricular ventricular node, and supercedes the sino-auricular node in this respect. This is due usually to an inhibition or depression of the S-A node, sometimes to a stimulation of the A-V node, and rarely to both. The heart rate is thus the rate of the A-V node. The stimulus arising from the A-V node may retrogress to the auricles as well as progress to the ventricles so that the auricles and ventricles contract simultaneously and in the electrocardiogram the P-waves which are usually inverted, are seen just before, and at times just after the QRS complex. Most usually the P-waves are buried in the QRS complex.

A tracing of the venous pulsations brings this out very nicely, for instead of the 3 waves, a, c and v, being present, a large c wave exists due to the simultaneous and accumulative action of the a and c contraction.

Occasionally the sino-auricular node may give off impulses during the

period of nodal rhythm if the S-A node is only depressed and not destroyed, so that stimuli may come from both pacemakers. However, the controlling rhythm comes from the A-V node. If the inhibition of the S-A node is released by exercise or drugs, such as atropin, transitory periods of normal sinus rhythm may be established and at times a permanent heart rhythm may be restored.

In the herein described case it was very easy to establish a transitory sinus rhythm by stimulation such as pressing on the vessels of the neck or by atropin, and now this even occurs spontaneously. The action of atropin upon the rhythm is well illustrated in the table. (See accompanying table.)

TABLE 1

Effect of atropine on nodal rhythm

TIME	HEART RATE	RESPIRATIONS	ELECTROCARDIOGRAM
2:10 P.M.	54	54	Nodal rhythm
2:15 P.M.	54	54	Nodal rhythm
2:25 P.M.	54	54	Nodal rhythm
2:35 P.M.	54–60 irregular	54	Short periods of transitory sinus rhythm
2:45 P.M.	58–64 irregular	58 irregular	Short periods of transitory sinus rhythm
2:55 P.M.	64–70 irregular	58–62 irregular	Longer periods of transitory sinus rhythm
3:00 P.M.	72 regular	58–62 irregular	Periods of normal sinus rhythm
3:10 P.M.	68 irregular	58 irregular	Shorter periods of normal sinus rhythm
3:20 P.M.	64 irregular	56	Transitory nodal rhythm
3:30 P.M.	60 irregular	56	Transitory nodal rhythm
3:45 P.M.	54–60 irregular	54	Nodal rhythm
4:00 P.M.	54 regular	54	Nodal rhythm

Atropine sulphate gr. 1/150 was given by hypodermic injection at 2:15 P.M.

Another interesting feature of this case is the fact that during the acute illness the respirations were very rapid and at times were synchronous with the heart rate; moreover, upon increasing the heart rate by stimulation, the respirations were also quickened to a degree. However, this would precipitate temporary hyperventilation with a consequent irregular pause in respiration almost similar to that occurring in Cheyne-Stokes breathing.

The patient has been followed now for more than a year at regular intervals. During this period, he had frequent attacks of upper respiratory infection accompanied by fever. Electrocardiograms taken at such times were identical to the previous tracings, revealing a persistence of the nodal rhythm with only transient dislodgement of the pacemaker.

Nodal rhythm is usually a temporary condition lasting from a few hours to a few days. It rarely continues over a period of months as in this

instance. Nodal rhythm may be encountered in the early phase of rheumatic heart disease; it may also be noted in diphtheria and scarlet fever, as well as in acute toxic conditions accompanying severe infections. The administration of digitalis may precipitate nodal rhythm. A disease process such as an arteriosclerotic or syphilitic plaque injuring the sino-auricular node may cause such a rhythm. It is occasionally seen in congenital heart anomalies. Then again, it may be found without there being a known etiological factor, as in this child.

Although it was noted first during the pneumonia, it is nevertheless possible that the condition pre-existed the infection, and disappeared for a time, to reappear in the course of the pneumonia process. It is of particular interest that the nodal rhythm persisted after the child made full recovery, and that it was easy to disturb temporarily the A-V node as pacemaker.

This case is presented primarily because of its rarity. No reports could be found by me in the literature, of the condition occurring in a child of this age.

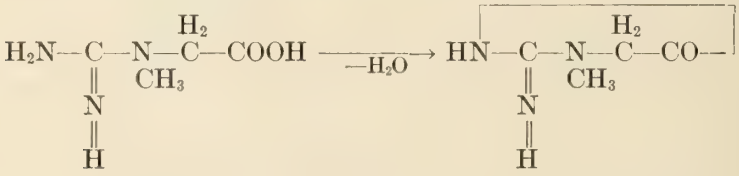
UNUSUAL CREATINE-CREATININE EXCRETION IN A CASE OF PSEUDOHYPERTROPHIC MUSCULAR DYSTROPHY

HERBERT POLLACK, M.D., J. EDWARD STERN, M.D., AND MIRIAM REINER, M.S.

[*From the Medical Service of Dr. George Baehr and the Division of Laboratories*]

Renewed clinical interest in creatine-creatinine metabolism is undoubtedly due to the recently disclosed relationship of creatine to muscular activity (1) and to the diseases of the musculature (2). The investigations of the creatinurias in muscular dystrophies have led to a better understanding of the disease processes and have afforded aids in the diagnosis and therapy of these conditions. This report deals with a case of pseudohypertrophic muscular dystrophy in which the findings are at variance with those usually observed (3) in other laboratories as well as in ours. We present these observations in order to demonstrate that isolated laboratory findings may be misinterpreted unless correlated with the clinical picture. A brief review of some biochemical data may serve to clarify the case.

Creatine is methylguanidine acetic acid. The methods for its determination in the urine are indirect. The standard method takes advantage of the fact that creatine is readily converted to creatinine in hot acid solutions (4). This is illustrated in the following equation:



Creatine Creatinine

The three steps involved in the analysis are as follows: determination of preformed creatinine by the Jaffe reaction (formation of a red colored solution with an alkalinized saturated solution of picric acid and colorimetric comparison with a known standard); conversion of creatine to creatinine in hot acid solution; redetermination of creatinine, the increase, if any, representing the amount of creatine in the original sample.

As shown in the formula above, creatine is a nitrogen-containing compound. 98 per cent of creatine content in the body is stored in the skeletal and cardiac muscles. It occurs in two known forms in the muscle, that is, as the free creatine and as creatine combined with phosphate (5). The

exact relationship of creatine phosphate to the chemistry of muscular contractions is not definitely known but without it muscular contraction is impossible (6). In the urine of normal adults creatine is excreted in amounts ranging from 0–100 mg. per 24 hours.

Creatinine is excreted in the urine in amounts ranging from 700–2,000 mg. per 24 hours. Daily excretion of this substance is quite constant for any given individual, provided exogenous sources (meat and meat extractives) are excluded. This consistency may be used as a means of checking the accuracy of urine collections.

The amounts of these two substances excreted in the urine have been carefully studied and found to vary from the *normal* in a wide assortment of physiological and pathological conditions, including: adolescence, menstruation, lactation, post-partum states, fever, acidosis, starvation, very high animal protein intake, carbohydrate deprivation, endocrine dysfunction (thyroid disease, diabetes mellitus), poliomyelitis, myositis, and the various muscular dystrophies (2).

The creatine tolerance test (7) has been introduced as a means of studying the metabolism of this substance. The patient limits his food to a meat-free diet for 3 days and a control 24 hour urine is collected under thymol and analyzed. He is then given a solution containing 1.32 Gm. of creatine hydrate $C_4H_9O_2N_3H_2O$ (which is equivalent to 1.0 Gm. of creatine $C_4H_7ON_3$ and the urine for the next 24 hours is again collected under thymol. The total volume, creatine, and creatinine content of the urine are determined. Normal subjects excrete only 10 per cent (males) to 20 per cent (females) of the ingested amount.

Almost consistently in the muscular disorders, and particularly in pseudohypertrophic muscular dystrophy, the following observations may be recorded: (a) the urinary creatine excretion is in excess of 100 mg. per 24 hours in the control period; (b) more than 30 per cent of the creatine ingested, i.e. more than 300 mg., is excreted in the urine in the 24 hours after its ingestion. In the case reported here, these deviations could not be found. While clinically there can be no question as to the diagnosis, the laboratory findings were essentially normal. After a period of glycine therapy the creatine tolerance test showed a definite change.

CASE REPORT

History (Adm. 382226). The patient was a 34 year old Spanish laborer who had lived in New York City for 15 years. He presented himself at the out-patient department of The Mount Sinai Hospital complaining of muscular weakness of three years' duration. Inspection disclosed atrophy of the musculature of the upper extremities and shoulder girdles with winging of the scapulae, pseudohypertrophy of the calves, and clubbing of the fingers. (See accompanying figure.) He was referred to the hospital and was admitted on July 16, 1935 to the service of Dr. George Baehr.

His family history was irrelevant for muscular and other disorders, except that his mother had fingers of the same configuration as his own, but, as far as he knew, had been otherwise quite well.

Three years before admission the patient first noted pain in the right scapular region which has persisted to date. One year later he developed



FIG. 1. Patient S. G. Note especially winging of scapulae, atrophy of upper arms, pseudohypertrophy of calves. Measurements: upper arms, $7\frac{1}{2}$ inches (18.7 cm.) from acromial tip: Right—$8\frac{1}{4}$ inches (20.6 cm.), Left—$10\frac{1}{4}$ inches (25.6 cm.). Forearms, 3 inches (7.5 cm.) below olecranon tip: Right—10 inches (25.0 cm.), Left—11 inches (27.5 cm.). Thigh, 8 inches (20.0 cm.) from anterior superior iliac spine: Right—22 inches (55.0 cm.), Left—$22\frac{3}{8}$ inches (55.9 cm.). Calf, 5 inches (12.5 cm.) below lower border of patella: Right—16 inches (40.0 cm.). Left—16 inches (40.0 cm.).

atrophy of the arm musculature, and in the following year noted progressive weakness of the right arm. This was further complicated by pain in the left arm and later by paresthesias of the fingers and toes. Two months before admission he developed pain in the right leg.

For three months he had had dizziness on bending over, polydipsia (16 glasses of water per day), polyuria, polyphagia, and had lost four pounds in weight.

Examination. There was some reddening of Shrapnell's membrane of both drums, and scattered rhonchi and bronchial squeaks were heard over both lungs. The liver edge was felt 2 cm. below the right costal margin. The blood pressure was 100 systolic and 85 diastolic in the right arm, 110 systolic and 85 diastolic in the left arm. The fingers and toes showed advanced clubbing.

Neurological Status. There was atrophy and weakness of the triceps and biceps muscles of both sides, more marked on the right; atrophy of the muscles of shoulder girdle with marked winging of the scapulae. There was also some atrophy of the right forearm. He was unable to extend the right forefinger; the calf muscles had the appearance of pseudohypertrophy. The deep reflexes in both upper extremities were diminished to absent. There was lumbar lordosis. The cranial nerves were intact. There were no sensory disturbances. The polyuria and polydipsia were not related to any obvious endocrine dysfunction. The neurologists concurred in the diagnosis of pseudohypertrophic muscular dystrophy.

Laboratory Findings. Hemoglobin 92 per cent, leucocyte count 8,900 with 64 per cent polynuclear leucocytes and 36 per cent lymphocytes. Routine urinalysis and blood Wassermann tests were negative.

The chemical analysis of the blood expressed in mg.-per cent was as follows: Urea—12, Uric Acid—2.0, Creatinine—2.0, Amino Acids—5.0, total Cholesterol—215, Cholesterol ester 33, Sugar—90, Calcium—10.7, Phosphorus—3.5. The total protein was 6.9 per cent (albumin—4.2 per cent, globulin—2.7 per cent). The basal metabolic rate was −2 per cent.

Electrocardiogram showed slight slurring of the QRS complexes and 1.0 mm. elevation of the RS-T transition in leads 2 and 3, which was not considered abnormal.

Roentgen examination of the chest showed bilateral pleural adhesions. Capillarioscopy showed findings considered to be those of congenital clubbing, i.e., the capillaries were not distended, and the subpapillary layer was not visible as in acquired clubbing. Lipiodol examination of the bronchial tree confirmed this opinion and excluded an original impression of dry bronchiectasis.

Oral glucose tolerance tests were made on two occasions:

July 18, 1935	*mg. per cent*	August 5, 1935	*mg. per cent*
Fasting	60	Fasting	105
½ hour	145	½ hour	135
1 hour	125	1 hour	105
2 hours	85	1½ hours	95
3 hours	90	2 hours	65
		2½ hours	70

No sugar appeared in the urine.

Creatine tolerance tests were carried out on three occasions while the patient was confined to the hospital.

DATE	NATURE OF TEST	VOLUME	TOTAL CREATININE	PREFORMED	CREATINE BY DIFFERENCE	PER CENT EXCRETED
		cc.				
*7/22/35	Control	875	875	730	145	14.5
7/23/35	Tolerance	1,350	810	675	135	13.5
7/24/35	Control	1,550	1,290	1,290	0	0
7/25/35	Control	1,500	1,210	1,190	20	2.0
7/27/35	Control	1,900	1,070	1,070	0	0
7/28/35	Tolerance	2,550	1,275	1,235	40	4.0
7/29/35	Control	2,090	1,045	1,045	0	0
8/ 6/35	Control	1,600	1,230	1,230	0	0
8/ 9/35	Control	2,200	1,035	1,035	0	0
8/10/35	Control	1,960	850	850	0	0
8/11/35	Tolerance	2,100	1,050	810	240	24.0
8/12/35	Control	1,810	775	720	55	5.5

* Not on creatine free diet.

A fourth creatine tolerance test was made after the patient had been discharged from the hospital and gave similar results:

DATE	NATURE OF TEST	VOLUME	TOTAL CREATININE	PREFORMED	CREATINE BY DIFFERENCE	PER CENT EXCRETED
		cc.				
8/28/35	Control	2,040	960	930	30	3.0
8/29/35	Tolerance	1,870	1,335	1,170	165	16.5

No medication was given during this period.

Then for the next three months' period glycine (30 grams daily) and ephedrine sulphate (gr. 3/8 t.i.d.) were given. The creatine tolerance test after this form of therapy was distinctly abnormal, even though there was still no creatinuria.

DATE	NATURE OF TEST	VOLUME	TOTAL CREATININE	PREFORMED	CREATINE BY DIFFERENCE	PER CENT EXCRETED
		cc.				
1/8/36	Control	2,930	1,170	1,170	0	0
1/9/36	Tolerance	2,420	2,100	1,210	890	89.0

Summary. A case of pseudohypertrophic muscular dystrophy is reported in which the creatine-creatinine studies gave normal readings, which is out of accord with the usual experience. The administration of glycine altered the creatine tolerance. No interpretation of what appeared to be a diencephalic syndrome (polydipsia, polyuria, polyphagia), can be advanced, although its coexistence with the pseudomuscular dystrophy is not without interest.

BIBLIOGRAPHY

(1) Fiske, C. H. and Subbarow, Y.: Phosphocreatine. J. Biol. Chem., 81: 629, 1929.

(2) Aring, C. D. and Cobb, S.: The Muscular Atrophies and Allied Disorders. Med., 14: 77, 1935.

(3) Milhorat, A. T., Techner, F., and Thomas, K.: Treatment of Progressive Muscular Dystrophy and of Similar Muscular Disturbances by Glycine. Deutsch. Arch. f. Klin. Med., 174: 487, 1933.

(4) Hunter, A.: Creatine Creatinine. Longmanns Green, London, 1928.

(5) Pollack, H., Flock, E., and Bollman, J. L.: Compounds of Phosphorus in Heart and Striated Muscles of Dog: Methods of Determination and Normal Values. Am. J. Physiol., 110: 105, 1934.

(6) Lundsgaard, E.: Weitere Untersuchungen über Muskel-Kontraktionem ohne Milchesaurebildung. Biochem. Ztschr., 227: 51, 1930.

(7) Shorr, E., Richardson, H. B., and Wolff, H. G.: Endogenous Glycine Formation in Myopathies and Graves' Disease. Proc. Soc. Exp. Biol. and Med., 31: 207, 1933.

(8) Magee, M. C.: Creatine and Creatinine Metabolism in Progressive Muscular Dystrophy; Report of 2 cases and controls. Am. J. Dis. Child, 43: 19, 1932.

THE CLINICAL AND ELECTROCARDIOGRAPHIC DIFFERENTIATION OF CORONARY THROMBOSIS FROM PULMONARY EMBOLISM

ARTHUR M. MASTER, M.D., HARRY L. JAFFE, M.D., AND SIMON DACK, M.D.

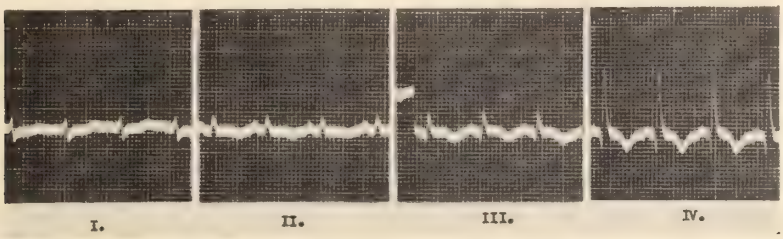
[*From the Medical Service of Dr. George Baehr and the Cardiographic Laboratory*]

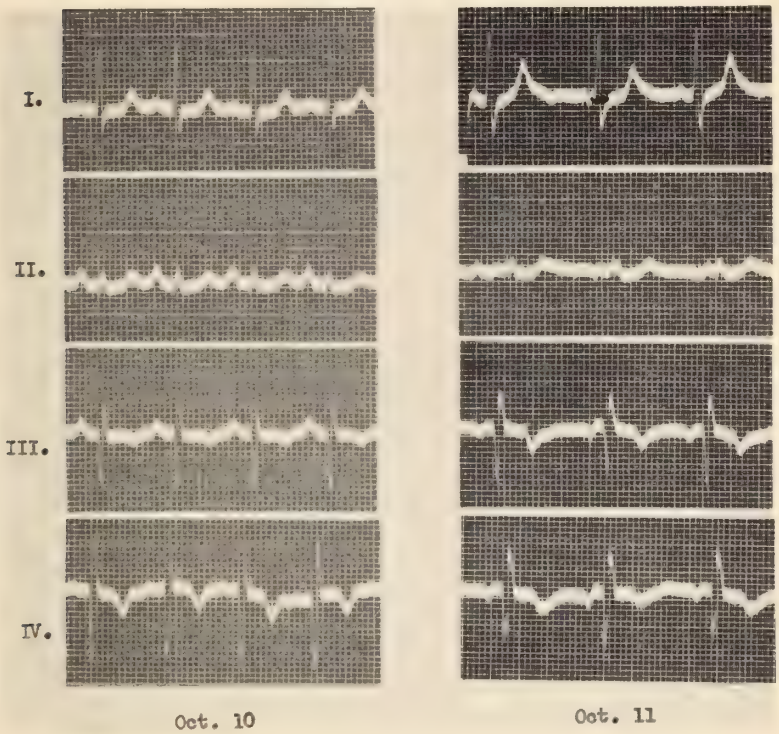
Not infrequently a diagnosis of coronary thrombosis is made clinically and at post mortem an embolus is found in the pulmonary artery. More commonly it is impossible to make a clinical differentiation between these conditions. McGinn and White have recently reported their findings in a series of cases of pulmonary embolism and believed they had observed characteristic electrocardiographic findings. In our experience their criteria have been only suggestive and the simulation of the electrocardiogram of coronary thrombosis is close enough to make the diagnosis uncertain. We think that a more accurate guide is the progressive change in the electrocardiogram in coronary thrombosis, from elevation of the R-T segment to inversion of the T-wave. This does not occur in pulmonary embolism. Furthermore we have been impressed by the fact that patients with pulmonary embolus present very severe dyspnea and tachypnea, out of proportion to the physical findings and not relieved even by oxygen. The following case presented a problem in diagnosis.

History (Adm. 385365). A 70 year old woman suffered a left hemiplegia two weeks prior to admission. With rest in bed this improved slowly, and the general condition of the patient was satisfactory. The blood pressure was 130 systolic and 90 diastolic. Several hours before hospitalization she suddenly became semi-stuporous, very dyspneic and cyanotic. The blood pressure fell to 80 systolic and 50 diastolic. On admission to the hospital the temperature was normal but respirations were forty per minute and labored. There was marked cyanosis and pallor. Scattered râles were heard at the bases of both lungs. The heart was not enlarged. The sounds were of fair quality and the aortic second sound was louder than the pulmonic. The cardiac rate was 116 beats per minute, the blood pressure 120 systolic 80 diastolic. The liver edge was palpable and tender. Examination of the central nervous system presented, in addition to evidence of a recent left hemiplegia, moderate nuchal rigidity and bilateral Kernig sign. The hemoglobin was 108 per cent, the white blood cells numbered 17,000 of which 89 per cent were polymorphonuclear neutrophiles. The sedimentation rate was three hours.

The electrocardiogram on admission showed a sinus tachycardia, rate

about 115 beats per minute; a left ventricular preponderance was present. There was a large Q-3 and low amplitude and notching of the QRS complex





Electrocardiograms taken on:

October 10, 1936: Sinus tachycardia, rate 115 per minute. Left ventricular preponderance. There is a large Q-3 and the QRS is low and notched in Lead 2. The RS-T segment is slightly depressed in Lead 2 and slightly elevated in Lead 4. T-3 is inverted.

October 11, 1936: P-wave has become inverted in Leads 2 and 3. The S_1 has become prominent. The T-wave is taller and pointed in Lead 1 and more deeply inverted in Lead 3. There are, however, no real progressive changes in the R-T segment.

in lead 2. The R-T segment was slightly depressed in the second lead and slightly elevated in lead 4. The T-wave in the third lead was inverted.

The following morning there were minor changes such as inversion of the P-wave in leads 2 and 3, a more prominent S-wave in lead 1 and a high pointed T-wave in this lead. The T-wave in the third lead was even more deeply inverted. However, there were no definite alterations in the records of the two days as one would usually see in coronary thrombosis.

The diagnosis lay between cerebral or pulmonary embolus and coronary thrombosis. Despite the continued use of oxygen the patient's condition grew worse, and she died in pulmonary edema in less than twenty-four hours.

The findings at post mortem were embolism of both main pulmonary arteries, pulmonary edema and congestion, coronary sclerosis with narrowing of the left anterior descending and left circumflex arteries. There was no occlusion.

COMMENT

The outstanding symptoms in this case were uncontrollable dyspnea, tachypnea and cyanosis, strongly suggestive of pulmonary embolism. Moreover, an oxygen tent did not relieve the dyspnea. This, we think, is an important differential point as the dyspnea of coronary thrombosis is relieved by oxygen therapy.

The electrocardiogram was not conclusive. It conformed to the pattern described by McGinn and White for pulmonary embolism, i.e., the Q-3 was large, S_1 prominent and T_3 inverted. On the other hand the right ventricular preponderance, which one would expect and which they describe, was absent and also the upright T_4. Furthermore, an electrocardiogram such as was obtained in this case may be present in infarction of the posterior wall of the left ventricle. Unfortunately death occurred too early to permit one to follow the progressive changes in the electrocardiogram. It has been our experience that the characteristic progressive changes in the electrocardiogram, i.e., R-T segment and T-wave changes, are found only in coronary thrombosis.

Conclusion. In pulmonary artery embolism the dyspnea is not relieved by oxygen therapy. This differentiates this condition from coronary thrombosis. Another deciding point is the electrocardiogram, for in coronary thrombosis characteristic progressive daily changes occur.

DIETARY DEFICIENCIES AMONG DISPENSARY PATIENTS

MORRIS L. DRAZIN, M.D.

[*From the Medical Outpatient Clinic of Dr. George Baehr*]

Among the chronically ill patients who frequent the Outpatient Department of the hospital, there are found many in whom no organic lesions can be demonstrated to account for their symptoms, and who present a number of clinical features common to this group, such as the sallow and muddy complexion, the complaints of multiple pains, the unusual fatiguability, the generalized weakness, nervousness, and hypersensitiveness to touch and pressure. Some bruise easily, and have a tendency to bleed from one or more of the several orifices of the body. Some also complain of arthralgias, the so-called neuritic pains, and of a dry, rough skin. Many of these patients are considered as suffering from psychoneuroses or conversion hysteria. However, treatment in the Mental Health Clinic fails to improve their condition.

The dietary history of these patients often discloses capricious, irregular eating habits, either because of prejudice, superstition, ignorance, or poverty. Their diets are one-sided, usually low in the so-called protective foods, i.e. animal proteins, milk, eggs, fruits and vegetables, and excessive in carbohydrates. At one time or another in the course of their malady they develop gastrointestinal complaints: anorexia, distention, vomiting, constipation, or diarrhea, but no organic lesion of the gastrointestinal tract can be detected to account for these symptoms.

The failure to find any definite cause for their complaints has led to the supposition that the symptomatology of these chronic invalids might be due, at least in part, to improper nutrition, and a number of patients have been investigated along these lines.

CASE REPORTS

Case 1. History (Adm. 361623). A 44 year old, married woman had attended practically every clinic in the Outpatient Department (10 clinics in all) from 1929 to date; and had twice been admitted to the wards of Mount Sinai Hospital, in 1933 and 1934. When a child, she was told that she had a large spleen; she also had congenital ptosis of the right eyelid, and a smaller right pupil. She underwent an appendectomy in 1922, and had a benign tumor of the breast removed in 1928. When she came to the Outpatient Department in 1929 she complained of weakness, loss of weight, bleeding from the rectum, and vomiting of blood. Her hemoglobin was 78 per cent. An extensive investigation, including complete gastro-

intestinal x-ray examinations and sigmoidoscopy, was negative. The patient improved after a sojourn in the country.

In July 1931, she developed large hematomas on her body. Repeated blood counts showed a secondary anemia. Her blood hemoglobin was 62 to 75 per cent, the blood platelets numbered 240,000.

In 1933 and 1934 she was admitted to the Mount Sinai Hospital with complaints of abdominal pain, purpuric manifestations, and weakness. She was discharged unimproved, and a diagnosis of purpura and ptosis of right kidney was made. The patient continued to visit the hematological clinic where she received snake venom injections. A gastrointestinal and urologic investigation disclosed no lesions to account for her pains, except ptosis of the right kidney, but no trapping in the renal pelvis was demonstrable. Treatment in the Mental Health Clinic was ineffective.

She was referred to the Medical Clinic in June 1935. She said that she felt weak, had pains everywhere, and had lost her appetite. She never ate well, always picking at her food. She took practically no fruits and vegetables because, as she said, they gave her gas. The dietitian estimated that this patient subsisted on an unbalanced diet of 1200 calories or less. The patient stated that she had noted bleeding tendencies for about 20 years, that ecchymoses on her skin had recurred for 10 years. For the past 4 years, due to economic difficulties and worries she had eaten very little. At this time the ecchymoses became more pronounced. They were not arrested by snake venom injections.

Examination. The physical examination was essentially negative, except for a palpable right kidney and numerous ecchymotic spots. The spleen was not felt. Her hemoglobin was 78 per cent; the red blood cells, 4,960,000; the blood platelets, 170,000.

The patient was given a more balanced diet which, aside from taking citrus fruit juices, she did not follow. The ecchymoses, however, for the first time in years, diminished in number and then disappeared, so that from September 9, 1935 to January 6, 1936, her skin was clear. She felt stronger but was still markedly neurotic and complained of pain. Because of home conditions the patient stopped taking citrus fruits, and about two weeks later she again developed ecchymoses. The importance of the treatment was impressed upon the patient. On her next visit, January 31st, she showed improvement; no new ecchymoses had appeared. The patient stated that she had resumed taking the fruit juices, although her general diet is still unbalanced. To date, despite the fact that she is complaining of pain in the right loin and right upper quadrant, she looks better and ecchymoses have not recurred. No organic lesion has been found to account for the pain.

Case 2. History (34–12566). A young girl of 19, came to the clinic a year and a half ago complaining of weakness, loss of weight, fatiguability,

nervousness, and menorrhagia every two weeks. She is one of seven living children. Her caloric intake was about 1800 calories, consisting mostly of bread and six to seven cups of coffee daily. The intake of protective foods was low.

Examination. She weighed 105 pounds (average for her height is 116½ pounds); and she looked poorly nourished. Her thyroid gland was moderately enlarged and she had a slight tremor of the hands.

Course. She was given a diet of 3200 calories, containing 100 grams of protein. Within a month she began to gain weight and strength, and her next period was normal. She was followed in the Gynecological Clinic concurrently, and special note was made there of the response of the menorrhagia in this patient to dietetic treatment without any other therapeutic measures. She now weighs 117 pounds, feels very well, looks bright and cheerful. Her periods are normal in amount and recur every twenty-two days.

Case 3. History (Adm. 381589). A married woman of 55 years, childless, came to the clinic in 1930 because of backache. She had had three abortions. She experienced her menopause 15 years ago. X-ray examination of the spine revealed atrophic changes in the bones. In 1933, she complained of abdominal heaviness and urinary frequency. Nothing was found on abdominal and pelvic examinations. Cystoscopy showed cystitis, which improved with treatment. In 1934, she was in a state of emotional upset following the death of her brother due to carcinoma of the stomach. About this time she began to complain again of abdominal heaviness and weakness, and again nothing definite was found. Her diet was confined to starchy foods, and did not include animal proteins, milk, nor fruits or vegetables. She was given dietary advice. Her hemoglobin at that time was 82 per cent; the red blood cells, 4,460,000. The stool contained no occult blood. On May 13, 1935, she had edema of the legs without heart or kidney disease, and without any apparent local cause. Her teeth were in poor shape; her blood pressure was 200 systolic and 120 diastolic; the heart was moderately enlarged. Heberden's nodes were present. Hyperpigmentation of the dorsum of the hands and feet was noted. The bones showed osteoporosis. In June 1935, she complained of weakness and presented ecchymoses over her body, one of them involving the entire internal surface of the right leg. Her diet was still unsatisfactory. A diagnosis of possible scurvy was made. She entered the hospital three weeks later, on June 28, 1935. In the meantime she had begun to consume citrus fruits and vegetables. On admission, she was already improving but still had some punctate hemorrhagic spots over both tibiae, and edema of the ankles.

Course. On a high vitamin, high caloric diet, the patient improved rapidly. The edema of the ankles and hemorrhagic tendencies disap-

peared. She gained weight and strength and after a short stay was discharged improved.

Since that time she has been followed in the clinic. She relapsed to her former eating habits, and began to complain of weakness. In October, she noticed some rectal bleeding. Thus far no new ecchymoses have been noticed. The patient continues under treatment, but because of home conditions, the outlook for a good result is problematic.

COMMENT

It is recognized that the improvement in the patients described here, is largely subjective. However, the disappearance of bleeding tendencies in some of the patients, on a more adequate diet, was unmistakable.

In the course of this study it was observed that the diet of many clinic patients is composed largely of highly refined carbohydrates, and is deficient in the protective foods—animal proteins, dairy products, fruits and vegetables, and whole grain cereals.

A diet of this type, deficient as it is in many essentials, is often responsible for chronic ill health in patients of the type studied. Their symptoms include a sallow complexion, multiple pains, weakness, fatiguability, tenderness to pressure and touch, bleeding tendencies, and numerous "dyspeptic" symptoms. While the diet cannot be corrected by feeding a single vitamin, the addition of protective foods to the diets of such patients often results in improvement of their general health and in the amelioration of many of their symptoms.

RECOLLECTIONS OF OLD MOUNT SINAI DAYS

ALFRED MEYER, M.D.

In the past few years I have frequently been importuned to write some reminiscences of my connection with Mount Sinai Hospital. It is, of course, the privilege of old age to reminisce, but who is to decide when that period in a man's life has been reached, permitting his tongue to wag freely and without restraint? If the retirement age of 62 years for surgeons and 65 years for medical men, fixes the period of old age at Mount Sinai, I have had my justification for reminiscing since 1919. I have hesitated heretofore because I have not kept a diary and because all of my hospital case books have been destroyed. At last, at the age of over 82 years, I have succumbed to an appeal by his Editorial Majesty, Dr. Globus, whose persuasively worded appeal was irresistible. And has it not been said that "to enjoy what is past is to have lived twice"?

As a boy in 1859 I moved from Greenwich Village to West 34th Street within six blocks of the Jews' Hospital, then located in a couple of altered tenement houses in 28th street, between Seventh and Eighth Avenues. The hospital was probably not more primitive than the neighborhood in which it was situated, which was looked upon as far uptown: sparsely populated, the roadway paved with cobblestones, rarely cleaned. The streets were poorly lighted, there were many vacant lots, and goats wandered everywhere. I myself built bonfires, baked potatoes, and picked tomatoes where the Empire State Building stands today. In the early 60's the hospital must have had its share of the casualties from the draft riots which occurred in the neighborhood, and of which I was in part an eyewitness: the burning of the colored Orphan Asylum in 40th Street, the attack on the Provost Marshall's office on Broadway and 28th Street, the hanging of a Negro to a lamp post at 6th Avenue and 33rd Street, and the escape of frightened colored men, women, and children from the mob to the State Arsenal at 35th Street and Seventh Avenue under protection of a squad of soldiers.

Many of the early Hospital Directors were personally known to me in later life: Joseph Fatman, Lewis May (for many years President of Temple Emanuel), Joseph Seligman (of the international banking firm), and Harris Aaronson. An early (first or second) President of the hospital (although I never met him), Benjamin Nathan, was my wife's uncle. The mystery of his murder one night in August, 1870, during a violent thunderstorm, has not been solved to the present day. The first house physician, Dr. Mark Blumenthal, was very well known to me, first when he was practicing at a

Long Branch hotel during the Civil War and I came under his professional care, and later when he opened an office in West 34th Street. He was tall (at least so he appeared to me), had bushy side-whiskers (whiskers and beards were, of course, the vogue at that time—just look at pictures of Civil War Generals, or of doctors who attended the Complimentary Dinner to Oliver Wendell Holmes as recently as April, 1883), and he bore himself with the typical dignity of doctors generally at that period. He married a second time late in life, and lived—shall I say in spite of that fact or because of it?—until he was, I believe, 90 odd years of age.

It may have been the large number of physicians living in my neighborhood that gave me an urge to study medicine. Among the number were



Mount Sinai Hospital 1871–1904
Lexington Avenue between 66th and 67th Streets

Dr. Abraham Jacobi, although he didn't come up to 34th Street from Amity Street until 1869 (I always teased him by calling him a "newcomer"); Dr. Schwedler, one of the founders of the German Hospital (now Lenox Hill Hospital), and with whose children I went to school; Dr. Chamberlain; Dr. Fessenden N. Otis, Professor of Genito-Urinary diseases at Physicians' and Surgeons'; and Dr. William A. Hammond, ex-Surgeon General of the U. S. Army, with whose daughter (later the Marchioness Lanza) I made mud-pies. At any rate, it was quite natural that when the time came, I should apply for interneship at Mount Sinai Hospital. This was early in 1877. There were only a few candidates, perhaps half a dozen or less, who presented themselves at the private home of each examiner. The examination in each instance was exclusively

oral. I can recall only two questions: the one in medicine was the symptomatology, pathology, and complications of typhoid fever; and the one in surgery was the treatment of a pistol shot wound of the abdomen!

At the time of my appointment, the hospital occupied the whole block from 66th to 67th Street, on the East side of Lexington Avenue. Opposite was a sunken lot that extended to Park (then Fourth) Avenue, occupied by a large colony of squatters who lived in a wilderness of primitive shanties. The Seventh Regiment Armory now dignifies that area.

The house staff totalled three men: A House Physician and Surgeon combined in one person, a Senior Assistant and a Junior Assistant, and all three had the entire range of the service. The daily average number of patients for several years was 115. These were all ward patients with the exception of possibly five or six private ones. There was an excessive number of chronics and incurables, for the Montefiore Home for Incurables (later Montefiore Hospital for Chronic Invalids), had not yet been founded. Some of the most hopeless cases were "dumped" (I mean just that) on Bellevue Hospital, but most patients, because of their faith, objected to being transferred. I remember a patient known as "Henrietta," suffering from a disseminated sclerosis of brain and cord, who had been a patient in the ward for five years before I arrived, who was still there when I departed 18 months later, and who finally died in the hospital after a stay of ten (or was it twenty ?) years. I have consulted my esteemed superior officer of long ago, Dr. Davison, who confirms me with reference to this extraordinary case. There were plenty of others—only not quite so bad, and not measuring up to Henrietta's standard of chronicity, vitality, and endurance, or the institution's hospitality!

Who can tell to what extent this choking of the service with chronics interfered with the admission of acute cases? But of course, some allowance must be made because sixty years ago people were less willing to enter the hospital for treatment, particularly in the case of acute illnesses.

Some months after my start on the house staff, there was a reorganization of the service into medical and surgical divisions, with a senior and junior resident on each, making a house staff of four, with a semi-annual rotation between the two services—a man being promoted to Senior on the division where he had last been Junior. This, of course, was conducive to familiarity with the cases when assuming the greater responsibility of Senior; and seemed to work well. Besides, there existed (mirabile dictu!) inter-departmental courtesy, so that when something exceptional or noteworthy was to be seen in one division, the members of the other division were notified. But there was also manifested some jealousy between the two services that cropped out in various ways from time to time.

At about the period of these house staff changes, there was considerable transformation in the Attending Staff. New departments were created and incumbents appointed to head them. Thus, Dr. Emil Noeggerath,

of latent gonorrhea fame, became the first Gynecologist; Dr. Emil Gruening the first Ophthalmologist; and Dr. Abraham Jacobi the first Pediatrician. Dr. Daniel Stimson, son-in-law of Dr. Willard Parker, was added to the surgical staff, as were Dr. John I. Darby (a relative, possibly a nephew, of Wade Hampton, the Confederate General, Governor, and Senator from North Carolina), and Dr. Isaac Adler. Dr. Noeggerath was long, lank, and lean, and wore ladies' gaiters—why, I never learned. He died of pulmonary tuberculosis in Germany many years ago. Dr. Gruening, who before he studied medicine had been a teacher and had served in the Union Army, was a most courteous gentleman, a cavalier in manner, and very familiar with Greek and Latin authors whom he was fond of quoting when occasion permitted. He did much to popularize the operation of mastoidectomy, as did Dr. Fred Whiting in later years. Dr. Stimson, jointly with Drs. William M. Polk and Gerardus Wynkoop, had run a quiz for medical students.

The Attending Staff came faithfully to see their cases but at very irregular hours and at uncertain intervals. In consequence, one never knew when to expect them, and not infrequently we were called away from our meals to accompany them on rounds. Naturally, we didn't like this a bit—those who are familiar with the phenomenal appetites of young internes will understand. Once in a while, one particular Attending would arrive, inquire of his Senior whether there was anything new, and if answered in the negative, would register in the book provided for the purpose and depart without having approached a single bedside. But I must accentuate that this really happened but seldom. The rules actually required two or three visits a week on the part of an Attending, but I recall that once during my Seniorship on the medical service, prolonged absence of the Attending necessitated my actually "going after him" because I was in doubt about the diagnosis in the case of a young immigrant woman just off shipboard. I wavered between typhus fever and cerebrospinal meningitis, but had had her isolated to be on the safe side. She died in a straight jacket a few days later—and I regret to state that even the autopsy did not solve her case.

Post mortems were infrequent, which is not surprising since the persuasion of the family for consent was left almost entirely to us internes. We were not attorneys or orators, and we were indiscreet in threatening the dire possibility of other deaths in the family from a similar cause. But neither were older men more successful in obtaining consent. One administrative officer was in the habit of asking the survivors: "You don't want a post mortem, do you?". And this happened within the last 40 years. Of course, refusal was easy under such a method of approach. Unfortunately, it was usually the most difficult and interesting cases in which consent was refused. I recall one post mortem—I think it was a leukemia that had been treated with intrasplenic injections of Fowler's

solution, and subsequently with a transfusion of defibrinated blood (probably an early transfusion on the medical side). I will not go into the details of this procedure, but will give an oral description to anyone asking it of me. The patient promptly responded with a chill and a temperature of 106 degrees. The post mortem revealed the spleen riddled with small abscesses. One duty of the Junior at post mortems was to do the sewing up. I recall a bit of bravado on my part. A post mortem had lasted very long, and as I was very tired, I stretched in one of the rude pine coffins and slept until I was called to do the sewing up. It was an extremely uncomfortable experience which I never repeated.

Major operations were infrequent and there was considerable grumbling on the part of the house staff on this score. Operations were done à la Lister under a cloud of carbolic acid vapor, and with the same astonishing results of primary union reported abroad and in this country. Our clothes were naturally impregnated with the odor of carbolic acid, and on my occasional home visits, members of my family used playfully to say that they could smell me a block away. Members of later staffs may rejoice that the period of antisepsis was soon superseded by that of asepsis and that the days of "shocking condition of the hands and martyrdom" were over. I believe that Dr. Arpad Gerster of the surgical Attending Staff, was the most active advocate of this beneficent substitution, and an important factor in bringing it about.

During my house staff period, two important new drugs were added to our therapeutic armamentarium: the sialagogue Jaborandi and the antirheumatic sodium salicylate. As Junior, it was my duty to sit at the bedside of any patient who had received an infusion of Jaborandi, in order to measure the amount of saliva secreted, and with watch in hand, to time the flow. I was not supposed to mind my exclusion from rounds while performing this bit of "research," but I surely did. There were many reports of collapse symptoms from the use of sodium salicylate and before long it became the rule to administer this new drug with an appropriate amount of whiskey or other cardiac stimulant.

Cocaine came into use at the hospital some years later. Immediately after Dr. Carl Koller's announcement at Heidelberg, through his friend Dr. Joseph Brettauer, of its practical anesthetic value, the news was cabled to New York by Dr. Herman Knapp, first Professor of Ophthalmology at the P. and S. There was naturally a great demand for the new chemical, only very little to be had, and I fear some of that little contaminated by free hydrochloric acid—at least so rumor ran at the time. I believe I paid as high as one dollar per grain of cocaine hydrochloride.

I had met Dr. Koller when he was still an undergraduate medical student in Vienna during the winter of '79 80. He was at the time also serving in the Austrian Army. He made a fine looking soldier as he strode, booted and spurred, on Sunday mornings, into the laboratory where a few of us

attended a weekly Seminar conducted by Professor Solomon Stricker. As I recall it, he wore blue trousers with white stripes and a big sword clanking at his side.

As in most hospitals of the period, nursing at Mount Sinai in its early years, was done by scrubmaids and untrained orderlies, and was naturally most primitive, but, strange to say, not as disastrous as one might have expected. Temperatures, pulse, and respiration were taken by the nurses, and recorded; enemata and vaginal douches were given, and catheterizations done. There was much comic spelling on the bedside sheets. I *believe* this persists to some extent even today. I *know* it died hard. With the establishment of the Training School for Nurses there was very gratifying improvement all along the line. But of this, more anon.

There were three elevators in the hospital, but for economic reasons they rarely functioned. One of the Attending Surgeons, Dr. Stachelberg, while climbing the stairs usually exclaimed in a markedly foreign accent, and not addressing anyone in particular: "Why am I so short of breath? Why am I so short of breath?". No accurate diagnosis was made during his lifetime. He died about 1880 of a ruptured aortic aneurism, as revealed at the autopsy, and thus the cause of his dyspnea was belatedly explained. Lack of elevator service was particularly distressing to the Juniors who had to lug heavy electric batteries all over the hospital—faradic and galvanic in separate equipment—with considerable risk, both to the machines and to the floors and stairways, from acid spilled en route. After much complaint, the services of a porter for this labor were finally granted.

It was not often necessary to discipline a member of the house staff. There were but few rules to guide us. In fact, it was many years later before rules were codified and printed and distributed.

Take it all in all, interneship days were crowded with daily (yes, and nightly) interest. One absorbed more information and experience in a day than one did in many weeks at the College. All of the Attendings were not equally informative or painstaking. It has always been my belief that the ideal medical teacher (and that's what an Attending should be), should do his thinking aloud, at the bedside if possible, or away from it if desirable or appropriate. When it is difficult or impossible to reach an immediate diagnosis there should be an analysis and temporary conclusions, and the reasons therefore, should be cited in the order of their probability, no matter how long the list, nor how apparently contradictory. One of the best men along this line was Dr. Gustav Langmann, one of the younger Attendings, with whom it was profitable to spend a half hour and more at a new patient's bed, weighing the pros and cons. He had been trained at Greifswald, Germany, was thorough in history-taking and physical examination. Being an excellent piano player, his hearing and touch, thus trained, became valuable aids in physical diagnosis. Some older men shone by the awkwardness and "thumpiness" of their method of percussion.

As a Junior, one of the pleasantest experiences, in my judgment, was the assignment, periodically during the summer months, to accompany our convalescent children on the excursions of the St. John's Guild Boat. These always took up a whole day, either steaming up the Hudson River or down the bay, giving a delightful outing to children gathered from many institutions, and incidentally, to tired Juniors. A really fine philanthropy, still similarly active, I believe, at the present day.

In 1877 and for some years afterward, the Dispensary was a picayune affair. It occupied a few rooms in the basement not otherwise assigned, and had but few departments, a small staff, and few patients. From time to time the house staff was called upon to substitute in the absence of the incumbent of the service. Quite a number of teeth were extracted with more or less skill by young internes. Dr. Mary Putnam Jacobi, wife of Dr. Abraham Jacobi, was a member of the Dispensary Staff, the first woman physician to hold any official position in the institution. She visited the wards occasionally as guest, and always proved herself a widely-read, discerning, and stimulating colleague—but sometimes she did take up an inordinate portion of our time.

Interneship was not all work, though there was plenty of that. For air and outdoor exercise, free of care and responsibility, two of us (one from each division) would take long walks through Central Park to the Old Block Fort at 110th Street, or over to Manhattan Square where the first building of the Museum of Natural History was in course of construction. If we were confined to the institution we would exercise on the roofwalk, which connected the so-called middle house, containing mainly administrative and living quarters, with the two wings, medical and surgical respectively, so as to be within easy call for any emergency.

But our main aesthetic relaxation was unquestionably music. I had an upright piano in my small room—it nearly crowded me out—and with the help of Dr. Davison, my senior by six months, who was a remarkably fine violinist, and of a 'cellist friend from outside, we had regular trio evenings. Our repertoire consisted mainly of the works of Beethoven, Mozart, Haydn, Mendelssohn, and Rubinstein. When the 'cellist was not available, of course, we had violin duos. I remember with special pleasure my introduction to the great violin concertos of Beethoven and Mendelssohn. It was, perhaps, fortunate that I never asked permission of the Board of Directors to bring in a piano. I refrained from doing so on the advice of Dr. Davison, of which fact he reminded me a few days ago (I had completely forgotten this strategy—forgetfulness pardonable, I hope, after nearly 60 years). But I must state that, so far as I know, there was never a single complaint made from any quarter, against our playing. On the contrary, even a Russian Count, a patient in the ward, sang our praises.

On one musical evening, the weather being warm, my window facing the courtyard was open, and hence the sound reached the wards more readily. The following morning on rounds I stopped at the bed of an old federal

Quartermaster who was still suffering from a chronic dysentery acquired during the Civil War, and said to him: "Well, Mr. Quartermaster, what kind of a night did you have?" He promptly replied: "To tell you the truth, Dr. Meyer, your music last night did me more good than your medicine." From the medical point of view the laugh was on me!

Much has been said in criticism of running hospitals under the authority of two boards, Medical and Lay. At Mount Sinai it has worked out very satisfactorily. This result is, in my estimation, largely due to three factors: *first*, the high type of men who with rare exceptions have constituted the Lay Board, (I refrain from classifying the Medical Board); second, the strict limitation of the Lay Board to questions of administration and finance, and of the Medical Board to purely medical and surgical questions of diagnosis and therapeutics; and third, to the existence since about 1883 of a Joint Conference Committee, consisting of elective members of both Boards, who discuss and adjust border-line medical administrative matters. I recall only one great conflict between the two Boards, and that occurred in the very early 1880's. It appears that great dissatisfaction had developed in the Lay Board in consequence of the many fatal results in ovariotomy cases. One day a member of the Lay Board arrived at the hospital and forbade an operation of this nature, which was about to take place and for which invitations had been extended to a number of the profession throughout the City. I am not able to state whether this was an independent step on his part or the result of action by the Lay Board, but I strongly suspect the former. The upshot of this episode was the resignation of the gynecologist in question and of a number of other sympathetic and aroused members of the Medical Board.

It was rarely necessary to discipline a member of the house staff during my incumbency. The men were all intensely interested in their work and eager to learn. But I do remember a reprimand one man received because he showed the poor taste, forsooth, of making rounds in his slippers! And one man was dismissed because, in addition to general dissatisfaction with him, it was learned after a short period of duty, that he had presented a false diploma of graduation from the University of Paris. This same individual, some years later, made a great stir in international finance in connection with boosting an electric light company in France, and if I am not mistaken, finally landed in jail.

I don't know why I wasn't reprimanded for an altercation I had in the main hall with a member of the Board of Directors, over a really trivial matter. We were separated before we came to blows. He was an essentially fine gentleman but he had a temper (perhaps I had one, too), and I know that not long after, at a meeting of his Board, he called a fellow member "an impudent puppy"—scarcely parliamentary language—and his name no longer appeared as Director in the Annual Reports.

I recall another narrow escape from at least a calling-down for several of us when it proved impossible to suppress our hilarity when the Attending, whose English was far from perfect, asked a patient with stricture of the esophagus: "Do you ever over-swallow yourself?"

Probably the strangest anomaly in the hospital administration occurred about forty-six years ago. It had always been difficult to locate members of the house staff when an Attending arrived for rounds. This caused harassing delays to busy men, so someone conceived the brilliant (?) scheme of installing a loud, high-pitched, factory whistle in the court yard. The arrival of an Attending was announced by a series of earsplitting blasts, the number varying according to the service to be notified. It was a wonder that the entire neighborhood didn't protest. Perhaps it did! At any rate, the abominable contrivance was soon abolished—to the great relief of everybody.

The Mount Sinai Training School for Nurses started in 1881. Drs. Julius Rudisch and Henry Newton Heineman were active participants during the formative period. My own connection with it did not come until after my appointment to the Medical Board of the Hospital as Attending Physician, in 1883. Two little high-stoop houses, whose combined front totalled only about 25 feet (or less), were rented at 850 and 852 (?) Lexington Avenue, near 64th Street, just two and a half blocks from the hospital. For convenience of administration, a door was made in the wall that separated them. The school was started with the twofold object of improving the nursing service and of offering opportunity for useful occupation to young Jewish women. The former aim was certainly attained—but the number of Jewish applicants was lamentably small. There were many applicants from Canada who, on the whole, made for themselves a very creditable record—a record considerably above the average. I am mentioning this because we took all the Canadians we could get, a policy that was not followed at the slightly older Bellevue Hospital School. Miss Brennan, the first Superintendent of that institution, wanted only women of American birth. In a discussion with her, I took the ground that our first duty was to the patients, and that probationers should be accepted if they appeared promising, irrespective of race or nationality. I admit there is something to be said in favor of both points of view.

The main instruction of the nurses was, of course, obtained at the bedside, but there were also a series of lectures given by volunteer members of the Medical Board, covering medical and surgical emergencies, anatomy, physiology, materia medica, and a few simple urine reactions. Later on, groups of nurses received obstetric training at the Sloane Maternity Hospital. The first contract for that purpose was signed by Dr. McLane and myself in the early 1890's. Other groups were sent to the New York Lying-in Society, because Sloane could not provide a home and instruction for all. Arrangements were also made with the Willard Parker Hospital

for a period of training in acute infectious diseases of childhood, a most important field which had hitherto been entirely neglected. In extenuation, it must be added that our Charter forbade the acceptance of obstetric and communicable diseases.

Speaking of the inadmissibility of communicable diseases reminds me of an instance when I was compelled to violate this hospital rule. One evening in 1886, on returning from the hospital to keep my office hour, I found a boy in my waiting room threatened with asphyxia from laryngeal diphtheria. He was deeply cyanotic and his stertorous breathing had the whole boarding house in an uproar. I went to the street corner (Madison Avenue and 58th Street), commandeered a passing grocery cart, and hurried with him to the isolation house where an immediate tracheotomy was done and the boy's life saved. I saw him many years afterward as a grown up man.

In the course of years, there have also been admitted a few women who presented themselves at the hospital in actual labor, and therefore could not be refused.

During a considerable period of my chairmanship of the Medical Committee of the School, Mr. Isaac Stern was its President. I still remember with astonishment and admiration (at that time not unmixed with alarm), how he bombarded me with letters and other communications regarding the nurses. How he managed to do so with his wide interest in business, and heading, as he did, one of the early large department stores of the city, is a mystery to me.

It happened, occasionally, that a class of nurses waited in vain in the classroom for the expected lecturer who had been detained by a professional call. To meet this difficulty, several futile attempts were made to persuade the School's Board of Directors to appropriate a sum of money from which to remunerate the lecturers. Like other well-intentioned people, they ignored the fact that doctors did not live rent-free, and that they, like ordinary mortals, had to meet the bills of butcher, baker, and candlestick maker.

Teaching at the School sometimes tended to exceed the needs of a trained nurse's career and to trench upon the physician's field. Nurses certainly did not need to know the finer structure of the retina or to attend post mortems. Such activities were faults of enthusiasm which, "although they leaned to virtue's side," were eventually eliminated from the curriculum. I must mention one event, however, that illustrated poignantly the danger of a nurse's "knowing too much," and invading the doctor's territory. It occurred in the winter of 1896–97, during my chairmanship of the Medical Committee of the School. I was called one day by the then Superintendent of Nurses—a product of our School—to see a number of nurses who were ill in bed with what she had diagnosed as influenza, then prevalent in epidemic proportions in the city. She had *treated* them

on that hypothesis for about a week, entirely on her own responsibility. Formal medical service had not, at that time, been established. After leaving the first room, I said to her, "Looks like typhoid." She took me to another room to see another supposed "influenza." On coming out, I repeated, "Looks like typhoid." And so it went from room to room until I had seen about half a dozen cases, all alike, and in none of whom any precautionary measures had been taken. Before we were through with that mess, we had an epidemic of about 19 cases on our hands, including the Superintendent herself, and the elevator boy—an epidemic that lasted almost three months and caused a serious disruption of the entire nursing service, not to speak of the suffering and anxiety caused those patients who might have escaped infection had there been the slightest attention paid to the usual typhoid prophylactic measures. In the Annual Report of the President of the School, the fact is mentioned that "we fortunately escaped any loss of life" and that it "had been found impossible to definitely locate the *cause* (italics mine) of the infection." But it was perfectly clear to me that the *spread* of the epidemic had been due exclusively to the Superintendent of Nurses in not calling a physician. In the following Autumn, when I had recovered from a long illness due in part to the strain of this outbreak, I stated this conviction unhesitatingly to several of the Board of Directors.

The Medical Library was founded by me in 1883 shortly after my appointment as Attending Physician. I did this partly from a sense of gratitude (I was not quite 29 years of age), and partly because I had recognized the need of one when I was an interne only five years before. I headed the list of subscribers with a contribution of $100.00 (may I confess it was hard on me?), and then went begging among the Medical Board members and a few outsiders. I succeeded in raising $500.00, mostly in contributions of $10.00 each. One member of the Board, supposedly the most intellectual, at first objected to helping, saying that the internes could go down to the Academy of Medicine for their reading. Think of it! The Academy of Medicine on West 31st Street, near Broadway—the Hospital on Lexington Avenue and 66th Street, and in the days of the horse car! I urged that if ever reading and study were to be done, and to become a daily habit, the books and journals must be handy. I was reminded of the Texan Rancher who was asked why he always carried a pistol. "You surely don't really use one often, do you?" "No, Ma'am," was the drawled reply, "I don't need one often, but when I do need one, I need it d—n quick." The hesitant colleague became a subscriber!

All Board members were appealed to for suggestions for literature, books and journals to be selected. The coöperation was fine and quite a good reference library of modern works was soon established and in operation. In 1896 a standing Committee on the Medical Library was created. Various methods of keeping the Library intact without restricting its use,

were tried during the seventeen or more years that I was in charge of it, for I had been warned by Dr. Thomas Satterthwaite of the New York Hospital Medical Library of the difficulties he had encountered there in preventing the loss of books. I had little to complain of on this score, but I confess that it did mean eternal vigilance.

In 1894 a large number of Adjunct Attending positions were established on the medical, surgical, and special services in consequence of friction that had arisen some time before between Dr. Heineman and myself, regarding the summer service. All the details of this friction are perfectly retained in my memory, in spite of the lapse of 46 years, and anyone interested may hear them from me verbally—for I fear these reminiscences are becoming too voluminous for the Editor, and perhaps for the reader as well.

As Secretary of the Medical Board from 1895 into the early 1900's, I often had the amusing experience of learning from outsiders who called upon me seeking positions, what was transpiring in the "politics" of the hospital. And it *did* seem strange that they should be better posted than the Secretary. The latter had no skilled help, and had to copy all his notes taken at meetings into huge record books. Some of these veterans were still available at the hospital some eighteen or twenty years ago. The Medical Board meetings were held monthly for many years at President Jacobi's residence, 110 West 34 Street. They were mostly amicable and moderately parliamentary. There was always a spirit of loyalty to the best interests of the hospital and to those committed to its care. Once in a while, our Surgeons displayed the "predatory" character ascribed to them all many years ago by a facetious editor of the New York "Medizinische Monatschrift." But in the long run, harmony prevailed. However, I *do* recall most clearly a very stormy meeting at which a member who had improperly and slyly interfered in another department, was mercilessly exposed. He grew deathly pale and nearly collapsed. The session was halted for a few minutes until the culprit (yes, culprit) recovered. After the meeting, nearly the entire Board adjourned to a neighboring beer saloon and drank the health of the member who had made the exposure. Despite the very generous distribution of cigars and carbonated water at these monthly meetings, the feeling grew that the proper place for Board meetings was at the hospital itself—where the background was neutral and impersonal, hence better suited for objective conclusions and independent judgments. And so the transfer finally took place in the late 1890's.

On the occasion of a recent visit to Dr. Turner, he reminded me to say something about Blizzard Monday, of March 12th, 1888. I could, of course, report many remarkable experiences connected with that memorable and phenomenal snow storm—the greatest of my lifetime—but these have no direct bearing on Mount Sinai—perhaps with one exception, namely, that so far as I know, I was the only member of the Attending

Staff who showed up at the institution that day. Unfortunately, the registration book of that remote year cannot be found, so I have no proof of the fact.

As the first President of the Mount Sinai Alumni Association (ancestor of the present Associated Alumni of the Mount Sinai Hospital), I had occasion, besides presiding at its meetings, to do so at some of its early dinners. I think it was at one of these, though I am not sure of it, that after Dr. Jacobi had finished speaking, I twitted him (to the consternation of many), by remarking that he had violated medical ethics because he had concealed the secret of his eternal youth. He promptly indicated that I had not "put my foot in it," by accepting my challenge. Rising a second time, he proclaimed proudly that the secret was simple enough, it consisted merely in association with younger men! A very wise and valuable bit of guidance for us old ones.

I own a large photograph of the Medical Board as it was in 1904. A copy was presented to each one of us by the then House Staff at a dinner at the old hospital, just before our removal to Fifth Avenue. There were thirteen in the picture, all of us actively practicing at the time. May I call the roll? First, seven who have passed away: Doctors Jacobi, Gerster, Gruening, Rudisch, Lustgarten, Brill and Koplik. Six are still living: Doctors Goldenberg, Sachs, Lilienthal, Manges, Brettauer and myself.

In these recollections, I have dwelt mainly on events of the last century. There remains much of interest that took place in the past thirty odd years, but they belong to a date almost too recent to permit of true "reminiscing." Perhaps Dr. Globus or some other untiring and devoted Editor will be good enough to call upon me some ten years later when I shall be over ninety-two (Deo volente), so I shall leave something to be said at that time.

CLINICAL NEUROPATHOLOGICAL CONFERENCE

Monday, December 14th, 1936

Israel Strauss, M.D., and Joseph H. Globus, M.D., *presiding*

Case 1. Spongioblastoma multiforme of the right parietal lobe and midbrain. Dr. Theodore Meltzer

History (Adm. 384329). A 64 year old housewife was admitted to the hospital on September 8th, 1935. She was apparently in good health until about three months before admission when she began to complain of a feeling of general weakness. Two months later she became somewhat dull and forgetful. Later it was noticed that she carried the left arm in a position of partial flexion and spared it, for she found it too clumsy. Shortly before her admission to the hospital, she experienced for the first time headache, and vomited.

Examination. She was disoriented for time, place and person. Her memory for recent events was impaired and she showed considerable difficulty in comprehending directions. Her blood pressure was 138 systolic and 70 diastolic. The left pupil was larger than the right. Both reacted sluggishly to light, the left more so than the right. The left arm was held in an hemiplegic position and used to a lesser extent than the right. The deep reflexes were hyperactive throughout, with those on the left greater except for the ankle jerks which were equal. There were bilateral Babinski and Hoffman signs, while Chaddock, Oppenheim, and Gordon signs were found on the left side only. Reaction to pin prick was diminished on the left side. A lumbar puncture yielded clear, colorless cerebrospinal fluid under pressure of 200 mm. of water. The serology was negative.

Course. At first the patient's mental condition tended to improve while the other neurologic signs remained unchanged. At the end of two weeks she suddenly lapsed into a state of semi-stupor. A lumbar puncture was done and it again yielded normal cerebrospinal fluid. She gradually declined and died seventeen days after admission.

Gross Anatomy. There was marked flattening of the convolutions. The brain was soft. On sectioning, an irregular hemorrhagic area was found in the right parietal lobe merging into the right occipital region. It measured 3 cm. in its antero-posterior diameter and 1½ cm. from side to side. Medially, it involved the optic thalamus, while at the anterior end it reached laterally the insula of Reil. Posteriorly, it was separated from the posterior horn of the lateral ventricle by a narrow rim of cerebral tissue, which was edematous. The entire ipsilateral hemisphere was markedly enlarged. The ventricular system was displaced to the left (Fig. 1). In the midbrain there were several small hemorrhagic areas (Fig. 2A), which contained small groups of tumor cells and represented the distal end of the main tumor mass.

Microscopic Anatomy. The cortex overlying the tumor was infiltrated with many anomalous and irregularly shaped cells. These became more numerous as

the subcortex was approached and the tumor tissue entered. Here, there were scattered areas of hemorrhage with necrotic zones surrounded by rows of palisading nuclei (Fig. 2B). The cells throughout the tumor were densely packed and varied considerably in shape and size. Silver stains revealed the gliogenous character of the cells, the majority of which had not attained full maturity. The vessels in the more fleshy parts of the tumor displayed considerable proliferation of the endothelial cells (Fig. 2C).

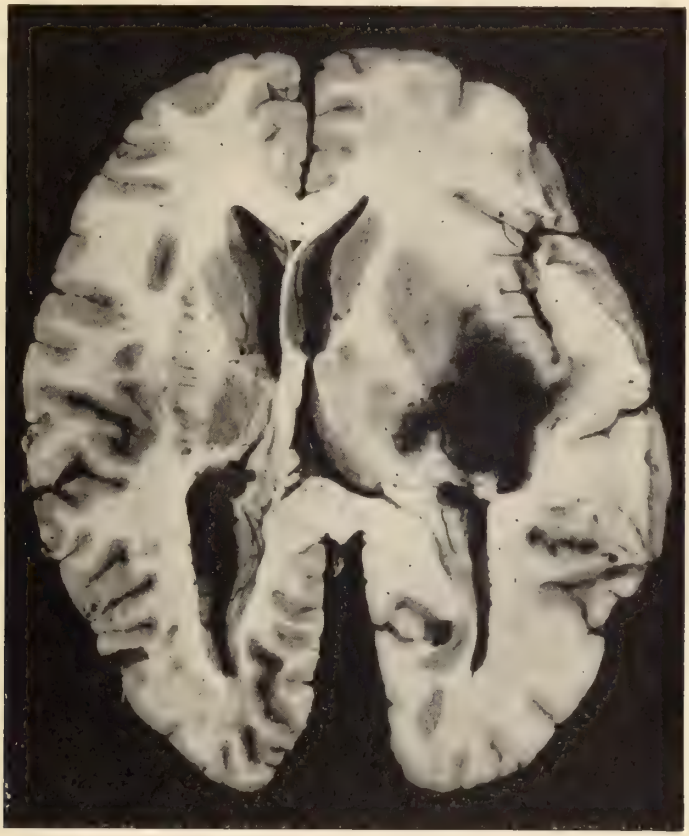


FIG. 1 (Case 1). Photograph showing tumor in the right hemisphere

Comment by Dr. Globus. The loss of power in an arm, the impairment of concentration and memory in a woman of 64 years with a history of hypertension lead to the suspicion of the existence of vascular disease. The absence of papilledema and the occurrence of only one episode of headache and vomiting would support the diagnosis of a cerebral vascular insult. The clear cerebrospinal fluid however points away from the probable occurrence of massive intracerebral hemorrhage, but the rapid decline and short history, with the absence of papilledema are out of accord with the diagnosis of a cerebral neoplasm. Even the gross anatomical findings did not present clear cut evidence of neoplasm. Only the microscopic study established the true character of the disease. The spongioblastic nature of

the tumor gives full explanation for the sudden onset, the short and atypical clinical course, and the fatal issue. Globus and Strauss in 1918 (1) and subsequently in 1925 (2) were first to call attention to this malignant form of gliogenous brain tumor which they have named spongioblastoma multiforme.

Comment by Dr. Strauss. The course of the illness in this case emphasizes the difficulty of differential diagnosis between vascular insult in a patient of advanced years, with arteriosclerosis and hypertension, and that of cerebral neoplasm. This

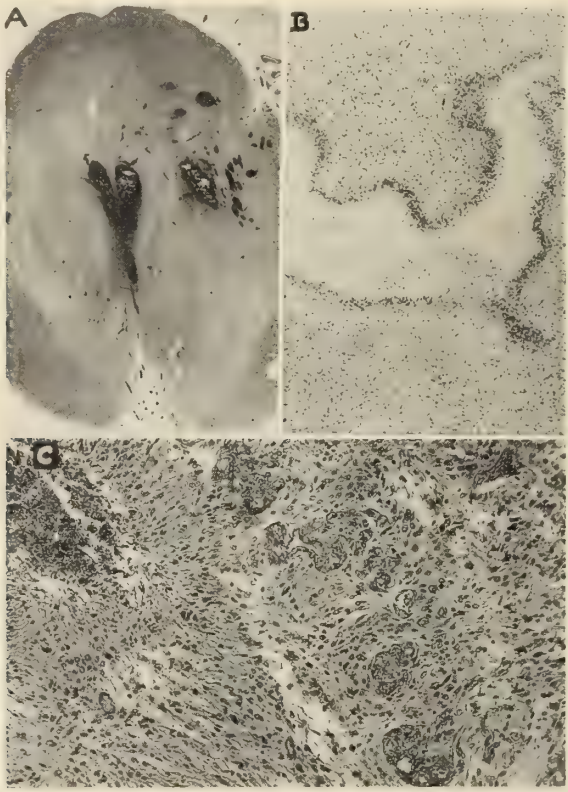


FIG. 2 (Case 1). A. Section of the midbrain showing hemorrhage and location of the caudal end of the tumor. B. Section of tumor showing serpentine arrangement of palisading cells with necrotic central zone (Hematoxylin and eosin stain). C. Section of tumor showing hyperplastic blood vessels (Hematoxylin and eosin stain).

difficulty is met with very frequently. It is only by the use of aerograms that the true diagnosis can be arrived at. In a person of advanced age, such as in the case under discussion, ventriculography is indicated rather than encephalography, and the surgeon must be prepared to interfere at once following this procedure.

In the case under discussion the improvement in the mental state of the patient, even though the objective signs did not improve, probably led us to incline more to the diagnosis of vascular lesion than to neoplasm. Furthermore, it should be borne in mind that when a person of this age gives an account of symptoms of short

duration a neoplasm, if not metastatic, is generally a spongioblastoma multiforme, and no good can be accomplished by operation.

Case 2. Spongioblastoma multiforme of the brain stem. Dr. Theodore Meltzer

History (Adm. 385848). A 48 year old woman was admitted to the hospital on October 27th, 1935. In 1925 she underwent an operation for cholecystectomy and in 1930 she had a perineal repair. In 1932 she was diagnosed as suffering from diabetes and hypertension. The recent illness began three weeks before admission when she noticed that there was some dimness of her vision which involved mainly the right eye. This gradually increased up to the time of admission. Along with this, she complained of a general feeling of weakness. For the three days preceding admission she had been drowsy and had slight lapses of memory. She vomited once.

Examination. The patient was stuporous. Her blood pressure was 190 systolic and 90 diastolic. The right pupil was larger than the left. Both were irregular and reacted sluggishly to light and in accommodation. There was diminution of upward gaze in both eyes, more marked on the right. There was slight weakness of the right arm and leg. All deep reflexes were exaggerated and more so in the right upper extremity. There was also a Babinski sign on the right side. There was bilateral ankle clonus. The spinal fluid was negative. The urine and blood sugar examinations were normal.

Course. Ventriculograms showed marked internal hydrocephalus, with enlargement of the third ventricle. The iter and fourth ventricle were not visualized. An inoperable, infiltrating, pontine growth situated in front of the iter, was diagnosed. She declined rapidly and died five days after admission.

Gross Anatomy. There was a bilateral internal hydrocephalus. A tumor was found occupying the left side of the tectum and tegmentum of the midbrain (Fig. 3A). Anteriorly, it was traced through the left peduncle into the hypothalamus where it measured about 1½ cm. in diameter (Fig. 3B). Posteriorly, it extended into the pons. In the region of the anterior quadrigeminal bodies the tumor spread to the right side and occupied almost the entire tectum and tegmentum of that portion of the brain stem.

Microscopic Anatomy. A study of the histological character of the tumor revealed a profusion of cell types arranged in a disorganized fashion. There were many pseudo-rosettes with the surrounding cells arranged in a palisade formation (Fig. 3C). There was also a great number of capillaries. Silver stains showed the presence of many bipolar spongioblasts (Fig. 3D).

Comment by Dr. Globus. The acute onset and rapid course is, in this instance, also in keeping with the clinical manifestations of spongioblastoma multiforme, which constitute the majority of cases of the so-called "acute brain tumor" as described by Elsberg and Globus (3). Its critical location, at the iter, at a point where it causes a most complete obstruction to the flow of cerebrospinal fluid contributed to the rapidly fatal issue by causing advancing internal hydrocephalus.

Case 3. Neurospongioblastoma of the left frontoparietal lobe. Dr. Theodore Meltzer

History (Adm. 384393). A 32 year old laborer was admitted to the hospital on September 12, 1935. At the age of 14 years he was hit on the head with a stone. Ten months before admission, while at work he struck his head against a pole. He

suffered no immediate ill effects, but that same evening became indisposed. During the night he suddenly awoke with both his arms and the right leg shaking

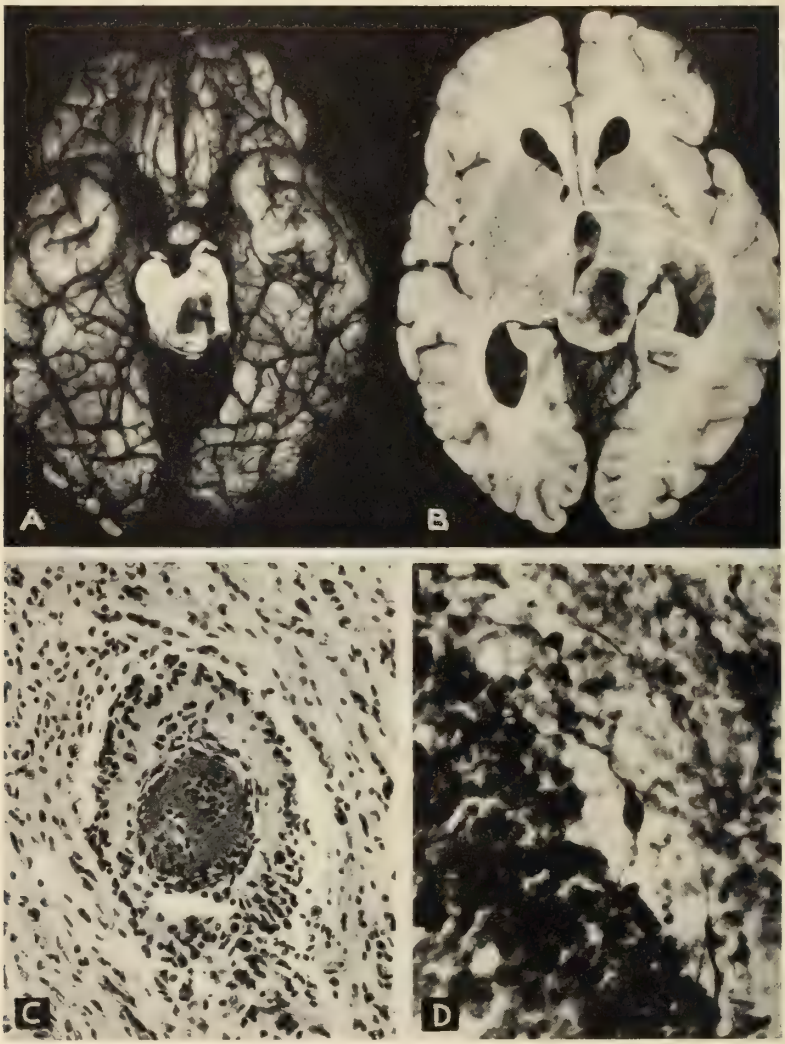


FIG. 3 (Case 2). A. Photograph showing tumor in midbrain. B. Photograph showing extension of tumor into the hypothalamus. C. Section of the tumor (Spongioblastoma multiforme) showing a pseudo-rosette arrangement about a blood vessel (Hematoxylin and eosin stain). D. Section of the tumor showing numerous bipolar spongioblasts (Globus modification of the Cajal gold sublimate impregnation method).

violently. During the following months similar seizures occurred, with the right side of the body convulsing more actively. One such seizure was said to have lasted for twenty minutes. He found some difficulty in concentrating and became

irritable and moody. Aside from a few mild muscular twitchings he was free from the convulsive attacks until the week before admission when he was seized by a severe convulsion accompanied by frothing at the mouth and biting of his tongue. These seizures affecting especially the right side of his body recurred several times until he entered the hospital.

Examination. The pupils were slightly irregular and reacted sluggishly to light. The reaction in accommodation was slightly better. The right pupil was larger than the left. There was some right facial weakness. The tongue protruded to the right and was tremulous. There was some weakness and ataxia of the right arm and leg. The deep reflexes were greater on the right side. There was an inconstant Babinski sign on the right side. The abdominal and cremasteric reflexes were diminished on the right side. His intellect was intact but somewhat retarded. The spinal fluid was under normal pressure and negative in all other ways.



FIG. 4 (Case 3). Photograph showing tumor in left frontal lobe

Course. An encephalography revealed displacement of the ventricular system to the right, more so anteriorly; the left lateral ventricle was depressed. The normal subarachnoid markings were absent on the left side. A lesion on the left side anteriorly and probably in the parasagittal region, was considered. An exploratory operation was performed but no lesion was noted on the surface, nor was it detected with the aid of an exploratory needle. The patient gradually declined and died six days after the operation.

Gross Anatomy. A tumor was found in the depths of the dorsal longitudinal fissure. It occupied the medial surface of the left frontoparietal lobe. Anteriorly, it extended to within almost $1\frac{1}{2}$ cm. of the frontal pole. The left frontoparietal lobe was larger than the right. It projected over to the opposite side displacing the falx cerebri (Fig. 4).

Microscopic Anatomy. Sections of the tumor tissue showed cells which varied in

size, shape, and staining qualities. Scattered giant cells and a number of mitotic figures were noted. There was an unusual number of small capillaries throughout the tissue. In the central portion there was a large area of hemorrhage and necrosis. Here and there, there were collections of closely packed neoplastic cells which resembled the "germinal centers" found in the foetal brain (Fig. 5A).

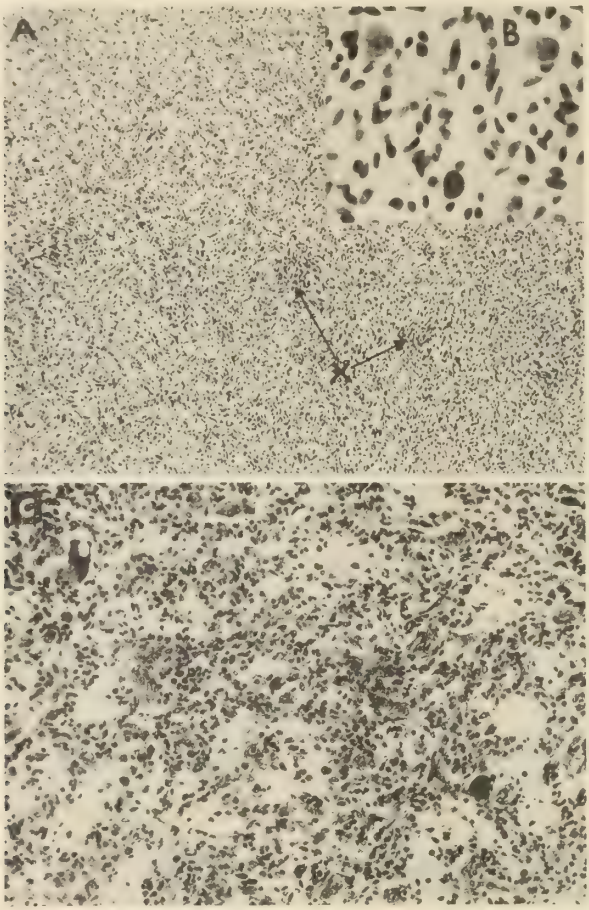


FIG. 5 (Case 3). A. Section of the tumor (Neurospongioblastoma) showing several collections of closely packed neoplastic cells (Germinal centers) (Hematoxylin and eosin stain). B. High power photomicrograph showing ganglion cells in the tumor (Hematoxylin and eosin stain). C. Section of the tumor showing some large, irregularly shaped, vacuolated cells (Hematoxylin and eosin stain).

Under high power, many ganglion cells were seen (Fig. 5B). In addition there were large, irregularly shaped and vacuolated cells (Fig. 5C). The central cortex overlying the tumor was thin and showed considerable departure from the normal cytoarchitecture.

Comment by Dr. Globus. There are several features of significance in this case. Violence to the skull is mentioned twice in the history. This, in view of the occa-

sional claim that skull injury may either provoke or aggravate the growth of a cerebral tumor, should be considered. But the fact that the first injury occurred some ten years ago and the last injury was almost immediately followed by the symptoms marking the onset of the illness, when coupled with the histological character of the tumor excludes the skull injury as an etiological factor. The tumor has many of the features of the so-called neurospongioblastoma described by Globus, Strauss and Selinsky (4), a tumor form akin to that found in association with tuberous sclerosis. The latter condition is undoubtedly blastomatous in character and may be regarded as a type of malformation dating back to the embryological phases of the developing nervous system.

Comment by Dr. Strauss. This case as described by Dr. Globus brings up the question of the relationship between trauma and cerebral tumor. In the literature there are many articles in which the claim is brought forth by reputable neurologists that a head injury has been the exciting factor in the growth of cerebral tumors. Some years ago even Cushing felt that trauma played a rôle in the development of meningioma, and Ewing, in an address on trauma and tumors before the New York Academy of Medicine, mentioned the possibility that if there had been an extensive laceration of the brain, with subsequent scar formation, it might be conceivable that a tumor might grow out of the reactive tissue in the neighborhood of such a scar, although he does not state that he, himself, believed in this possibility. It is therefore frequently a question of medico-legal significance.

Neither Dr. Globus nor myself believe that tumors of the brain arise in this fashion. It is also frequently claimed in medico-legal procedure that a blow to the head may aggravate the growth of such a tumor, and such claims are frequently encountered in neurologic literature.

In the case under discussion the head injury which was received when the patient was 14 years of age has no bearing upon the condition. The subsequent injury cannot be looked upon as an etiologic factor in the production of the tumor because the symptoms of tumor came on immediately after the injury. The question would be as to whether or not there was an aggravation of the growth of the tumor through the trauma. In substantiating this claim it would be argued from a legal standpoint that the large area of hemorrhage and necrosis in the central portion of the tumor might be due to the blow which had been received. Yet ten months elapsed from the time of the trauma until the death of the individual. It might be claimed that other hemorrhages had occurred in the tumor, which had been absorbed, and that these other hemorrhages had taken place at the time of the trauma. In respect to this it must be remembered that tumors of this nature, as shown by the microscopic study, are very vascular and that hemorrhages occur spontaneously in such tumors and do not act as a factor in the production of the symptoms.

Why the symptoms occurred immediately after the trauma and not before, is something that cannot be explained. One may only suppose that the tumor being present, the trauma in some way or other disturbed the equilibrium of the brain structure and evoked the convulsive seizures. On the other hand it is to be noted that there apparently was no affection of consciousness following the trauma, and that the individual felt no immediate effects. If the trauma had caused any serious disturbance in the brain there should have been some symptoms of concussion.

One may also believe that though the history is one of an acute onset after the

blow to the head was received, that there were other symptoms indicative of cerebral neoplasm, which were so slight in degree that the individual paid no attention to them and was only apparently a well man before the trauma.

Case 4. Transitional glioma of the left occipital lobe. Dr. Grant Levin

History (Adm. 382318). A male Russian woodcarver, 70 years of age, was admitted to the hospital on August 8, 1935. He was a known diabetic for ten years, during which time a dietary control had been adequate. About a month before admission he began to have attacks of dizziness and a week later, some visual difficulties. He had some trouble finding his way about the house, fumbled for objects, and when walking in the street, kept one eye covered (which eye, is not known). Three days before admission he began to complain of severe headache and of weakness of the right arm and leg. He became gradually unable to communicate his thoughts. Since the onset of his illness, he had lost about 25 pounds.

Examination. The patient was stuporous. The right fundus showed elevation of the disc and numerous retinal hemorrhages. Opacities of the media prevented a thorough examination of the left eye. There was a flaccid hemiparesis, with the Chaddock, Gordon, and Oppenheim signs on the right side. There was also an Oppenheim sign on the left side. The deep reflexes in the upper extremities and the abdominal and cremasteric reflexes were absent. There were apparent motor and sensory aphasia and perseveration.

Laboratory Data. Initial pressure of cerebrospinal fluid on lumbar puncture was 600 mm. of water. Globulin was 2 plus, and there were 7 cells per cu. mm. Blood sugar was 160 mg. per cent and the urine showed small amounts of sugar on repeated tests. X-ray examinations of the chest, gastro-intestinal tract and urinary tracts were negative. He was believed to have a tumor of the left cerebral hemisphere.

Course. There were only minor fluctuations in his general status, with a maintained elevation of cerebrospinal fluid pressure. Two weeks after admission he lapsed suddenly into a deeper stupor, became generally flaccid and died within 24 hours without rallying.

Gross Anatomy. The dura was tense and when opened, the gyri were universally flattened. The surface of the left parietal lobe posterior to the postcentral gyrus was soft and yellowish. Small nodules of considerably increased consistency were palpable beneath the surface of the occipital pole and mesial surface of the left occipital lobe. The surface of this area exhibited a sharply defined reddish-yellow discoloration. When the brain was cut, a tumor mass was found to occupy almost the whole of the left occipital lobe (Fig. 6). The mass was generally grayish-yellow in color, with several brownish red areas. In its proximity to the ventricle it showed a deep reddish discoloration. The cortex of the involved hemisphere was swollen and edematous. The right ventricle was larger than the left and both were displaced to the right.

Microscopic Anatomy. The meninges covering the left hemisphere were thickened, showed fibroblastic proliferation and were infiltrated by tumor cells. The tumor tissue was fairly densely packed with cells forming irregular sheets, strands and whorls. In silver stains they proved to be predominantly unripe glial elements. In hematoxylin and eosin preparations (Fig. 7), they showed characteristically oval nuclei, containing moderately staining clumped chromatin and scanty cytoplasm. There were numerous young capillaries.

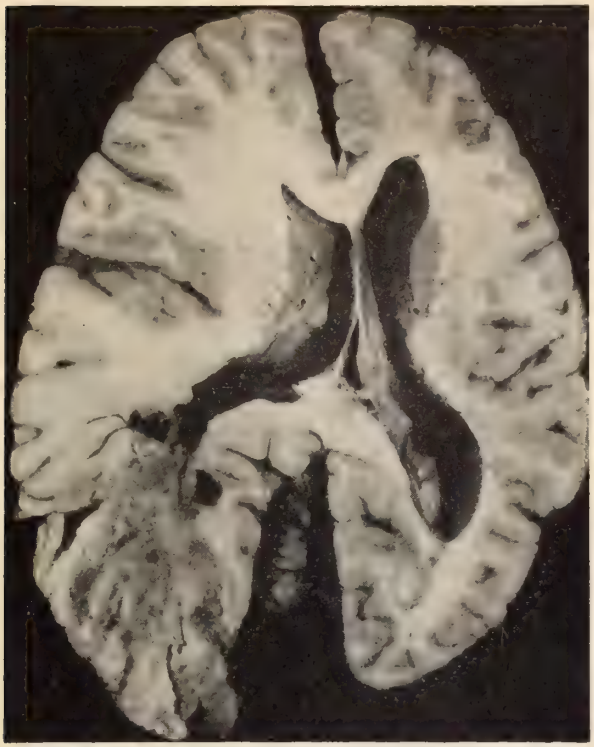


FIG. 6 (Case 4). Photograph showing tumor in left occipital lobe

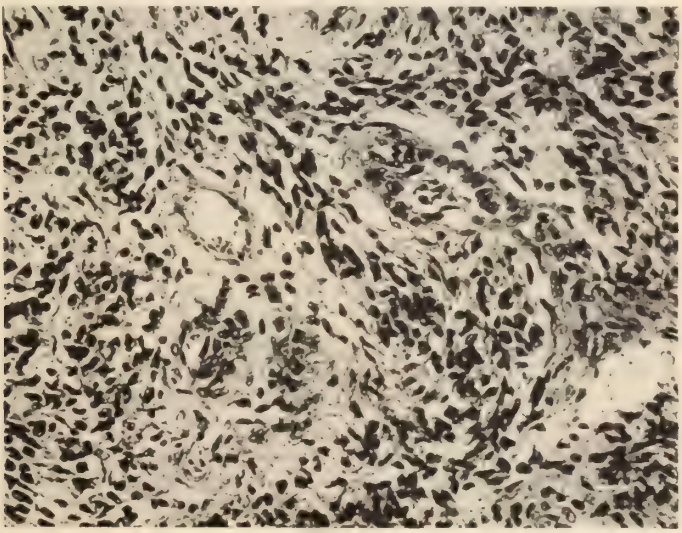


FIG. 7 (Case 4). Section of the tumor (Transitional Glioma) showing elongated nuclei of palisading cells (Hematoxylin and eosin stain).

Comment by Dr. Globus. It is rather uncommon to find a gliogenous tumor in an individual of the age of this patient, but for some reason such gliogenous tumors as have been found in patients of advanced years, were of the transitional form. The suddenness of onset of symptoms in an old individual, in one who was known to be a diabetic, in spite of the relatively low blood pressure, would certainly lead one to look for a vascular lesion. This is true in spite of the retinal hemorrhages and early papilledema. Here again, the experience with the spongioblastic and transitional forms of brain tumor led to the suspicion of a cerebral neoplasm. The term "transitional glioma" was introduced by Globus (5) to designate a gliogenous tumor form, which presents features common to both the glioma and spongioblastoma and cell forms which have not attained the character of ripe glia nor have they retained the undifferentiate nature of spongioblasts.

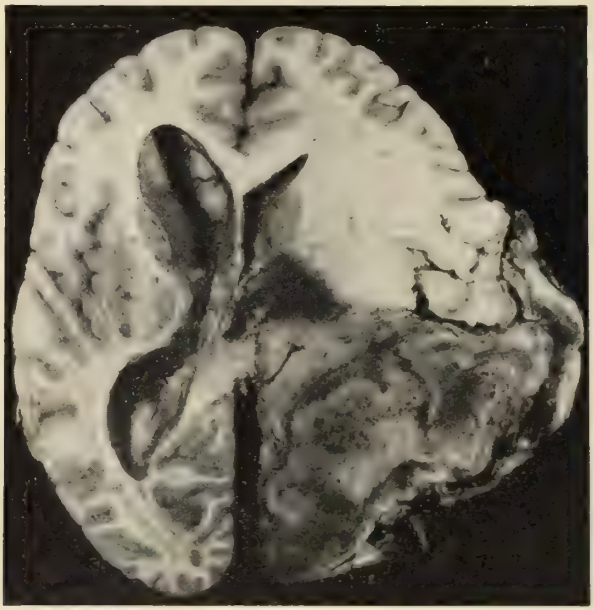


FIG. 8 (Case 5). Photograph showing tumor in the right occipital lobe

Case 5. Transitional glioma of the right cerebral hemisphere. Dr. Grant Levin

History (Adm. 375961). A man aged 48 years was admitted to the hospital on January 23, 1935. About six months before admission he began to complain of episodes of "dizziness." Three months later he developed a mild headache and commenced to have brief incidents described as "fainting" during which he lost consciousness. One of these attacks which occurred while he was driving a truck, caused an accident. The patient, however, received no apparent injury, but began to experience severe left frontal headache and generalized body pains. It was accompanied by an elevation of temperature. This condition lasted four days and was attributed to pansinusitis. Three weeks before admission his headache became more intense and upon examination at another hospital there were disclosed a left homonymous visual field defect and elevated cerebrospinal fluid pressure with a

pleocytosis of 32 cells. Three days before admission there was further increase in the severity of the headache and there appeared nausea and periodical irrationality and inattention.

Examination. The patient was drowsy, was only partially oriented, displayed poor memory for recent events, and impaired powers of comprehension and attention. He showed percussion tenderness over the right frontoparietal area and the right frontal and maxillary sinuses. There were bilateral hyposmia, photophobia, a gross left homonymous field defect, and bilateral early papilledema. Paresis of the muscles of the left side of the face was present and there was moderate resistance

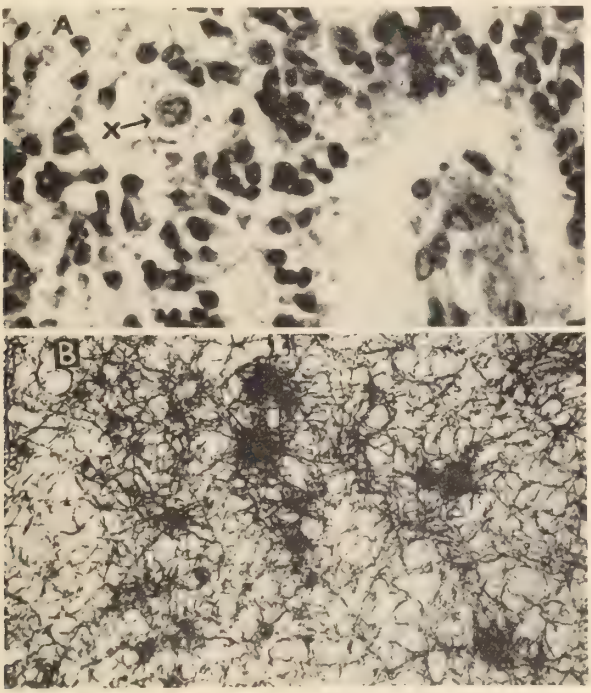


FIG. 9 (Case 5). A. Section of the tumor (Transitional Glioma) showing mitotic figures (x), cellularity and vascular endothelial proliferation (Hematoxylin and eosin stain). B. Section of the tumor showing dense aggregation of astrocytes (the Holzer method).

to passive flexion of the neck. There was generalized muscular weakness, mild ataxia and delay in the performance of alternate movements, more profound on the left side.

Laboratory Data. White blood cells: 14,500 per cu. mm. Cerebrospinal fluid initial pressure, 230 mm. of water. Ayala index 3.0; globulin 1 plus; faint xanthochromia; cells 47 lymphocytes per cu. mm.

Course. An intracranial tumor localized in the right temporo-parietal lobe was diagnosed without the aid of pneumoencephalography. At operation, a cystic tumor about 3.5 cm. in diameter located 5 cm. deep in the temporal lobe, was found and removed. The next day it was necessary to return the patient to the operating

room for hemostasis. Following this, the wound became infected, with subsequent spread to the subjacent intracranial contents. On two later occasions it was deemed advisable to reopen the wound for removal of the osteomyelitic flap and re-institution of drainage. These and supportive measures availed little, however, and he declined slowly, manifesting meningeal affection, somnolence, elevated cerebrospinal fluid pressure, xanthochromia and polymorphonuclear pleocytosis which he continued to present at intervals until exitus occurred six weeks later.

Gross Anatomy. At the operative site the brain and the extracerebral structures were fused by dense fibrous tissue. The adjacent brain substance was disorganized, bulging markedly through the cranial defect, with the upper right temporal, lower parietal, and part of the right occipital lobe being considerably swollen and softened. Posteriorly, in the depths of this area there seemed to be a mass of firmer consistency. When sectioned, it was found to be a grayish-white, firm tumor mass which occupied almost the whole of the occipital lobe, leaving a cortical crust reduced to 2 or 3 mm. in thickness (Fig. 8). When traced forward it was found to merge with an area of softening occupying the right thalamus, at the tip of which there appeared to be a separate tumor mass, fleshy-red in color. Posteriorly and laterally there were cystic cavities filled with colloidal material. The ipsilateral ventricle was deformed and almost obliterated, while its fellow was dilated throughout.

Microscopic Anatomy. The fundamental features of the tumor were its cellularity, widespread areas of necrosis, hemorrhage, and the presence of a plentiful leucocytic invasion. Many of the vessels displayed proliferative transformation. The tumor cells varied in shape; in some areas they tended to be elongated and to form streams; in others they were represented mainly by highly chromatic round nuclei amidst which there are visible many mitotic figures (Fig. 9A). The silver stains showed them to be predominantly unipolar and bipolar spongioblasts, but numerous astrocytes were present, accompanied by a thick meshwork of glial fibers (Fig. 9B).

Comment by Dr. Globus. The size of tumor, in view of the relatively short duration of the clinical course would indicate its rapid growth. The histological appearance of the tumor bears this out. It is placed among the transitional forms of glioma, in view of the fact that the giant cells which are essential for diagnosis of spongioblastoma, are not found here. However, the transitional form of glioma is also malignant in character.

REFERENCES

(1) Strauss, I., and Globus, J. H.: Spongioblastoma with Unusually Rapid Growth. Neurol. Bull., 1: 273, September, 1918.

(2) Globus, J. H., and Strauss, I.: Spongioblastoma Multiforme: A primary malignant form of brain neoplasm; Its clinical and anatomic features. Arch. Neur. & Psych., 14: 139, August, 1925.

(3) Elsberg, C. A., and Globus, J. H.: Tumors of the Brain with Acute Onset and Rapidly Progressive Course: Acute Brain Tumor. Arch. Neur. & Psych., 21: 1044, May, 1929.

(4) Globus, J. H., Strauss, I., and Selinsky, H.: Das Neurospongioblastom, eine primäre Gehirngeschwulst bei disseminierter Neurospongioblastose (Tuberöse Sklerose). Zeit. f.d. ges. Neuro. u. Psych., Bd. 140: Heft 1 u. 2, 1932.

(5) Globus, J. H.: Die Umwandlung gutartier Gliome in bösartige Spongioblastome. Zeit. f.d. ges. Neur. u. Psych., Bd. 134: Heft 3 u. 4, 1931.

INDEX OF VOLUME THREE

The (*) preceding the page number indicates an original article; the letters "ab" similarly placed indicate an abstract; "cp" signifies a clinical pathological conference report. Author entries are made only for original articles. Obituaries are indexed under this heading in alphabetical order under the letter "O." Book reviews are entered in alphabetical order under the letter "B."

ABSCESS, pulmonary, *118
of lung, following dental operations, ab259
of liver, *267
Adenoma of bronchus, *79
Agranulocytosis due to arsenobenzol, cp244
Air cysts of lung, giant, acquired, *155
Albuminuria, unilateral lordotic, *193
Anemia, pernicious, with toxic hepatitis following liver therapy, *162
Angioblastic sarcoma, pulsating, *20
Appendicitis, gangrenous, cp184
Ascites, with ovarian carcinoma, *124

BEER, Edwin, unilateral lordotic albuminuria (orthostatic albuminuria), *193
Beller, A. J., solitary liver abscess, a report of two cases, *267
Bile salts, influence on nervous system following intraspinal usage (experimental), ab191
Bronchial fistula and chronic empyema, *105
Bronchopneumonia, suppurative, complications and sequelae of, cp36
Bronchus, adenoma of, *79

CAPILLARY development and its relation to intelligence of children with mongolism ab254
Carcinoma, ovarian, with ascites, in relatively young women, *124
Cardiovalvular disease presumptively syphilitic in origin, ab260
Cardiovalvular disease, rheumatic, with thrombo-endocarditis, cp245
Cardiovascular studies in patients with single functioning lungs, ab190
Chest leads in clinical electrocardiography, ab259
Chiasm, pial epidermoid of, *216
Cholecystitis, relation to pathologic changes in liver, ab260
Circulation time in failure of left side of heart, ab190
Circulatory dynamics in myocardial infarction, ab189
Cirrhosis, atrophic (Laënnec), cp54
Cirrhosis, atrophic, with icterus, cp56
Citrate blood transfusions in treatment of rheumatic fever, *17
Coeliac disease in an adult, cp247
Colitis, ulcerative (non-specific), ab258
Colitis, ulcerative, and peritonitis, cp98
Colitis, ulcerative, terminae, cp179
Colp, Ralph, regeneration of hepatic duct epithelium, *261
Complications and sequelae of suppurative bronchopneumonia, cp36
Compression in femoral neck fractures, new device for securing and maintaining *65
Conference, clin. of thoracic group, Mar. 2, 1936, cp36
clinical neuropathological, Dec. 14, 1936, cp308
clin. path. Nov. 13, 1935, cp48; Nov. 20, 1935, cp93; Nov. 27, 1935, cp178; Dec. 11, 1935, cp182; Dec. 18, 1935, cp184; Jan. 15, 1936, cp241; Jan. 22, 1936, cp244; Feb. 26, 1936, cp247.
Congenital polycystic kidneys, *210
Coronary artery thrombosis, relation of various factors to onset of, *224
treatment by prolonged bed rest, ab258
effect of diet in case of, *74
differentiation from pulmonary embolism, *288
Creatine-creatinine excretion in case of pseudohypertrophic muscular dystrophy, *282
Cysts (air) of the lung, *155
(dermoid and corpus luteum) effect of removal on secretion of mammary gland, *213
(epidermoid) of the chiasmal region, *216

DACK, Simon, effect of lowered basal metabolism induced by diet on volume output and work of heart in case of coronary thrombosis, *74
et al., relation of various factors to onset of coronary thrombosis, *224
et al., clinical and electrocardiographic

differentiation of coronary thrombosis from pulmonary embolism, *288
Depersonalization, genesis of feeling of unreality, [ab]257
Diagnosis of some parasitic diseases, essential points in, *128
Diet, effect of lowered basal metabolism on volume output and work of heart in coronary thrombosis, *74
Drazin, Morris L., dietary deficiencies among dispensary patients, *291
Direct action in medicine, *137
Diverticulum, Meckel's, enteric intussusception due to invagination of, *1
Dietary deficiencies among dispensary patients, *291
Druckerman, Leonard J., pulsating angioblastic sarcoma, *20

EFFECT of lowered basal metabolism induced by diet on volume output and work of heart in coronary thrombosis, *74
Electrocardiography, use of chest leads in, [ab]259
Elitzik, Robert C., the occurrence of toxic hepatitis in pernicious anemia treated with liver extract, *162
Empyema, chronic, and persistent bronchial fistula, *105;
bilateral, accompanying acute purulent pericarditis, *149
Endocarditis, acute bacterial, or otitic sepsis? *121
Enteric intussusception due to invagination of Meckel's diverticulum, *1
Epidermoid (pial) of chiasmal region, *216
Erf, Lowell A., acute infectious mononucleosis with unidentified structures in the supravital preparations of the lymph nodes, *113

FABELLA (sesamoid) in the lateral head of the gastrocnemius, [ab]254
Femur, compression in fractures of neck, *65
Fever of unknown etiology—lymphogranuloma venereum, *273
Fistula, bronchial, persistent, with chronic empyema, *105
Fractures, femoral neck, compression in *65
Frank, Robert T., origin, development and present activities of the gynecological endocrine research division, *167
Frontal lobe tumor, mental symptoms of, [ab]254

GAIS, Elmer, S., a case of leptothricosis, *201
Garlock, John H., treatment of persistent bronchial fistula and chronic empyema, *105
Genesis of the feeling of unreality, [ab]257
Glandular enlargement, report of a case due to lymphogranuloma, *24
Glioma, transitional, [cp]316, [cp]318
Glomerulonephritis, chronic diffuse, [cp]51
Glycosuria, renal, [ab]257
Gynecological endocrine research, origin and development of laboratory at Mt. Sinai Hospital, *167

HEART, effect on volume output and work of, by lowered basal metabolism, in case of coronary thrombosis, *74
effect of posterior lobe pituitary on action of, (experimental), [ab]189
circulation time in failure of left side of, [ab]190
Hemoblastosis, generalized, [cp]94
Hemorrhage, nasal, treatment by injection of moccasin snake venom, [ab]260
Hennell, Herman, acquired giant air cysts of lung, *155
Hepatitis (toxic) in pernicious anemia treated with liver extract, *162
Hepatosplenomegaly, report of a case with glandular enlargement, due to lymphogranuloma venereum, *24
Hepaticoduodenostomy, spontaneous, [cp]29
History of Jewish physicians in the United States up to 1900, [ab]254
Horder, Rt. Hon. Lord, direct action in medicine, *137
Hormone, estrogenic, contained in ovarian tumor, [ab]256
Horn, Henry, spontaneous hepaticoduodenostomy, [cp]29
Hysterotomy and tubal excision following pregnancy after bilateral tubal ligation, *85

IN Memoriam:
Davis, Irwin I., Vol. 3, ⁂4
Steiner, Milton, Vol. 3, ⁂4
Intestinal tuberculosis, [ab]256

JAFFE, Harry L., *and others*, relation of various factors to onset of coronary artery thrombosis, *224
clinical and electrocardiographic differentiation of coronary thrombosis from pulmonary embolism, *288
Janeway, Edward Gamaliel, lecture: direct action in medicine, *137
Jaundice, painless, [ab]255

KIDNEYS, polycystic, congenital, *210
King, Frederick H., and Som, Max, L., adenoma of the bronchus, *79
Klempner, Emanuel, ovarian carcinoma with ascites in relatively young women, *124
Klingenstein, Percy, enteric intussusception due to invagination of Meckel's diverticulum, *1

Kohn, Jerome L., triangular shadow at the base of the lung, *7
Kornblith, Borris A., lymphogranuloma venereum—report of a case with glandular enlargement and hepatosplenomegaly, *24
fever of unknown etiology—lymphogranuloma venereum *273

LEADER, Sidney D., nodal rhythm in an infant, *278
Leptothricosis, *201
Leukemia, acute myeloblastic, cp93
Levin, Grant, transitional glioma of the left occipital lobe, cp316
transitional glioma of the right cerebral hemisphere, cp318
Liddell, H. S., Pavlov, the psychiatrist of the future, *101
Lilienthal, Howard, the Mount Sinai Hosp. and its surgeons of the middle eighties, *229
Lippmann, Robert K., new device for securing and maintaining compression in femoral neck fractures, *65
Liver, relation of cholecystitis to pathologic changes in, ab260
solitary abscess of, *267
Liver extract, toxic hepatitis in pernicious anemia treated with, *162
Lung, triangular shadow at base, significance in protracted pulmonary disease in children, *7
acquired giant air cysts of, *155
single functioning, cardiovascular studies on patients with, ab190
tumor of superior sulcus, *198
putrid abscess of, following dental operations, ab259
Lymphogranuloma venereum, report of case with glandular enlargement and hepatosplenomegaly, *24
Lymphogranuloma venereum—"Fever of unknown etiology"
Lymphosarcomatosis, generalized, cp97

MAMMARY gland, abnormal secretion from, following removal of dermoid and corpus luteum cyst of the ovary, *213
Master, Arthur M., *and others*, relation of various factors to onset of coronary artery thrombosis, *224
clinical and electrocardiographic differentiation of coronary thrombosis from pulmonary embolism, *288
Mayer, Max D., pregnancy after bilateral tubal ligation, *85
Meckel's diverticulum, enteric intussusception due to invagination of, *1
Melanosarcoma of the optic disc, ab259
Meltzer, Theodore, spongioblastoma multiforme of the right parietal lobe and midbrain, cp308
spongioblastoma multiforme of the brain stem, cp311
neurospongioblastoma of the left frontoparietal lobe, cp311
Mental symptoms in cases of tumor of frontal lobe, ab254
Metabolism (basal), effect of lowered rate on volume output and work of heart in coronary thrombosis, *74
Meyer, Alfred, recollections of old Mount Sinai days, *295
Mintz, Maurice, E., new and effective treatment for trichomonas vaginitis, *14
Mitral stenosis, cp178
Mongolism, relation of capillary development to intelligence of children with, ab254
Mononucleosis, acute infectious, *113
Moschcowitz, Eli, superior sulcus tumor, *198
Moulages: their preparation and use, ab259
Mount Sinai Hospital and its surgeons of the middle eighties, *229
recollections of old days at, *295
Myocardium, circulatory dynamics in infarction of, ab189
two-step test of function of, ab191

NERVOUS system, influence of bile salts following intraspinal usage (experimental), ab191
Neurinoma of the orbit, ab257
Neurospongioblastoma, cp311
Nodal rhythm in an infant, *278

OBITUARY: Maurice Frankfort, *253
Oedipus situation, reactivation of, ab60
Orbit, mixed tumor of, ab255
neurinoma of, ab257
Origin, development, and present activities of the gynecological endocrine research division at Mt. Sinai Hospital, *167
Ortiz, Pedro N., essential points in the diagnosis of some parasitic diseases, *128
Otitic sepsis or acute bacterial endocarditis, *121
Ovary, carcinoma of, with ascites in relatively young women, *124
abnormal secretion of mammary gland following removal of cyst of, *213

PANCREAS, cystadenocarcinoma of, cp48
Parasitic diseases, essential points in diagnosis of some, *128
Pavlov, the psychiatrist of the future, *101
Pericarditis, acute purulent, with bilateral empyema, treated surgically, *149
Pial epidermoid of the chiasmal region, *216
Pituitary, (posterior lobe) effect of, on heart action (experimental), ab189

Placental immunity, [ab]255
Pollack, Herbert, *and others*, unusual creatine-creatinine excretion in case of pseudohypertrophic muscular dystrophy, *282
Polycythemia vera, [cp]182
Pregnancy after bilateral tubal ligation, subsequent hysterotomy and tubal excision, *85
Pulmonary, abscesses, two with 14 year interval, *118
 significance of triangular shadow at base of lung in disease, *7
Pulsating angioblastic sarcoma, *20
Pyonephrosis, bilateral, calculous, [cp]241

REACTIVATION of the Oedipus situation, [ab]60
Recollections of old Mount Sinai days, *295
Regeneration of hepatic duct epithelium, *261
Reiner, Miriam, *and others*, unusual creatine-creatinine excretion in case of pseudohypertrophic muscular dystrophy, *282
Renal glycosuria, intermittent and continuous, [ab]257
Rheumatic fever in old age, [cp]251
Rheumatic fever, treatment by multiple citrate blood transfusions, *17
Rosenstein, Alice, pial epidermoid of the chiasmal region, *216
Rosenwasser, Harry, otitic sepsis or acute bacterial endocarditis? *121

SARCOMA, angioblastic, pulsating, *20
Snake venom, in treatment of intractable nasal hemorrhage, [ab]260
Som, Max L., and King, Frederick H., adenoma of the bronchus, *79
Spongioblastoma multiforme, [cp]308
Spontaneous hepaticoduodenostomy, [cp]29
Stenbuck, Joseph B., a case of septic thrombophlebitis of left common iliac vein and its tributaries, with spontaneous recovery, *90
 a case of acute purulent pericarditis with bilateral empyema treated surgically, *149
Stern, J. Edward, *and others*, unusual creatine-creatinine excretion in case of pseudohypertrophic muscular dystrophy, *282
Stern, Leo, two pulmonory abscesses in a patient, with a 14 year interval, *118
Sulcus (superior) tumor of, *198
Suppuration, bronchopneumonic, complications and sequelae of, [cp]36
Surgeons of Mount Sinai Hospital in the middle eighties, *229
Surgical treatment of acute purulent pericarditis with bilateral empyema, *149
Sussman, Marcy L., congenital polycystic kidneys, *210

THROMBOPHLEBITIS, septic, of left common iliac vein, *90
Thrombosis coronary, effect of lowered basal metabolism induced by diet, *74
 relation of various factors to onset of, *224
 treatment by prolonged bed rest, [ab]258
Transfusion, multiple citrate blood used in treatment of rheumatic fever, *17
Transitional glioma, [cp]316, [cp]318
Treatment, of persistent bronchial fistula and chronic empyema, *105
 of rheumatic fever by multiple citrate blood transfusions, *17
 for trichomonas vaginitis, *14
Triangular shadow at the base of the lung, significance in protracted pulmonary disease in children, *7
Trichomonas vaginitis, *14
Tubal excision and hysterotomy following pregnancy after bilateral tubal ligation, *85
Tuberculosis of intestines, [ab]256
Tumor, of superior sulcus *198
 frontal lobe, mental symptoms of, [ab]254
 malignant Grawitz and amyloidosis, [cp]242
 of orbit (of salivary gland type), [ab]255
 of orbit, neurinoma, [ab]257
 ovarian, containing estrogenic hormone, [ab]256
 primary, of optic disc, [ab]259
 spongioblastoma, [cp]308
 neurospongioblastoma, [cp]311
 transitional glioma, [cp]316, [cp]318

ULCERATIVE colitis (non-specific) [ab]258
Uterus, adenocarcinoma of, with carcinoma of gall bladder, [cp]57

VAGINITIS, due to trichomonas, *14

WALTER, Robert, abnormal secretion from mammary gland following removal of dermoid and corpus luteum cyst of ovary, *213
Weiss, Harry, treatment of rheumatic fever by multiple citrate blood transfusions, *17

THE MOUNT SINAI HOSPITAL
JACOBI
LIBRARY
NEW YORK

18761
Journal of the Mount Sinai
Hospital
v. 1-3 1934-1937

LEVY LIBRARY MT. SINAI MEDICAL CENTER
3 4805 0059368 7